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[Founded in 1849 as the "Journal of Gas Lighting."]

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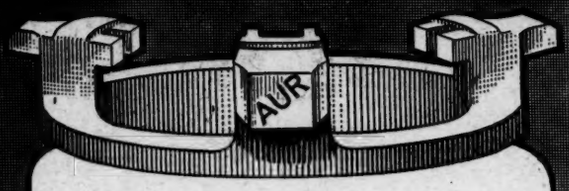

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLVIII., No. 2947.] TUESDAY, NOVEMBER 4, 1919. [71ST YEAR.

EDITORIAL NOTES.

The Revised New Charter.

THROUGH our columns to-day, by the courtesy of Sir George Beilby, the Director of Fuel Research, the gas industry will learn precisely where it stands at the moment regarding the conditions of its future operations—both gas manufacturing and trading; and we cannot but regard the situation with much greater satisfaction than was the case only a short time since. When the report of the Fuel Research Board was originally issued, questions at once arose relating to the limitation of 12 p.ct. of inerts, the suggestion as to the more complete removal not only of the sulphur but of the cyanogen compounds, and the pressure of not less than 2 in. on the gas at the exit of the consumers' meters—all of which were needless hardships. To the main proposal as to gas undertakings being allowed to select their own standard of calorific value to which they should work under their individual conditions, there was, of course, no objection, though there was a division of opinion as to the proposal to charge for gas on the B.Th.U. basis. But it was soon appreciated that this was regarded in the advisory quarters of the Government as an indispensable condition to the working of the gas industry on a thermal in lieu of the old volume basis. We see value in the condition; and, if we did not, it is one that it was wise to accept in order to gain another of far more importance to the industry and the public. The points in dispute have been the subject of several long and earnest discussions between the parties concerned—Sir George Beilby (with the Metropolitan Gas Referees), the National Gas Council, and local authorities representing the gas consumers; and, at a conference last Tuesday, there was a final agreement, under which the proposed restrictions were somewhat loosened, the inerts restriction had a time condition attached, and no reference appears regarding sulphur compounds other than sulphuretted hydrogen.

The gas industry has not obtained the full liberty for which it contended; but it is considerably better off than under the original conditions, which would have done so much to cripple the ability of the industry to do the best possible in the near future to supply B.Th.U. by way of their canalization, and to serve the interests of coal conservation. What it has now got must be accepted. But, of course, it cannot yet be definitely stated that the agreement that was come to on Tuesday will not undergo modification, though we do not anticipate that it will. It is an agreement that will have to be confirmed by the London County Council; but we should imagine that it is hardly likely the Council will dissent from a settlement deliberately come to by responsible officials negotiating on their behalf. What the County Council do, it may be assumed will be subscribed to by other local authorities. There is also the Board of Trade. Will they frame their promised Bill on the lines of the agreement, or alter it? We do not think there is the slightest likelihood of the Board departing from an agreement of this nature, but will accept it as it stands. We are emboldened to believe this will be the case by the very anxiety that the President (Sir Auckland Geddes) has evinced, together with those who are specially identified with this matter at the Board of Trade, to help the gas industry to surmount the pile of difficulties which have come upon it through the war and changes in economic circumstances, and not through any misdoing of its own. And further strength is given to this view by the evident satisfaction of Mr. Garnham Roper, when speaking at the luncheon of the British Commercial Gas Association [a report of his speech appears in this issue], that an agreement had been effected over the outstanding points. He regarded it as a good omen for the Bill when it comes forward, inasmuch as an agreed Bill has a much easier path in Parliament than one that is opposed. Although there may be some disappointment in the industry that relaxation is not greater in view of the fact that the B.Th.U. basis of charging will give so much protection to the consumer, and research informs us that thermal efficiency is not affected by a fairly considerable proportion of inerts in the gas, the conditions of the agreement are the best that good endeavour and reasoning could secure. For what has been done, thanks are especially due to the patient work of both Sir George Beilby and the President of the National Gas Council (Mr. D. Milne Watson); and all others concerned were equally anxious to reach some acceptable compromise. That the result means much to the gas industry, that it will give opportunities for a larger life and service, are beyond all dispute. It opens up a new chapter in the history of the gas industry. When in the Government Bill and the Bill gets into the Statute Book, the conditions laid down will be those that will have to be accepted by every gas undertaking. Taken together, they may look revolutionary; but they mean positive and continuous progress.

Running lightly over the conditions as they now stand, as shown by the statement received from Sir George Beilby [p. 237], there is acceptance of the system of charging for potential thermal units supplied to the customer; and 100,000 B.Th.U.—a polemical point which no further discussion is likely to modify—is to be the gas unit. The calorific value is to be continuously registered by a recording calorimeter of a standard type to be passed by the Gas Referees, who will also prescribe the method of installing, using, and checking the instrument. The Simmance total heat recording calorimeter with which Sir G. Beilby is experimenting is giving an excellent account of itself—very little correction having been so far necessary. Experience varies with predecessors of the continuous recording type; but the improved form appears to give assurance that certitude is close at hand. As to inerts—the chief point of discontent and argument since the issue of the original report of the Fuel Research Board—while gas undertakings are to be at liberty to deliver any mixture of gases, free from sulphuretted hydrogen, the gas or mixture is not to contain more than 20 p.ct. of inerts for two years; in the second two years the figure is not to exceed 18 p.ct.; and thereafter the maximum will be stabilized at 15 p.ct. So there are to be four years' grace before gas undertakings will have to work to the 15 p.ct. maximum, which is an improvement on the 12 p.ct. But as limitation will, it seems, commence immediately the Act is passed, there had better be early preparation. We can see the limitation combining with economy to give a further fillip to the adoption of water-gas and steaming processes, as with proper working these are the means of securing (exercising care at the coal-gas retorts) a good combustible gas of the declared calorific power, with a low content of inerts. Concerning pressure, five years is the time to be allowed within which to set the distributing system in order. During that period, a gas undertaking is to supply gas of such pressure that, under normal conditions of supply and equipment, there shall be a pressure of not less than 20-10ths in any main or service-pipe of 2 in. diameter and upwards. The gas undertakings in districts in which there are subterranean workings will welcome the continuance of the words "under normal conditions of supply and equipment;" and those undertakings with straggling districts, and long small diameter pipes stretching out towards the boundaries,

will welcome the concession of the 2-in. pipe, and the abandonment of the onerous condition "at the exit of the "consumer's meter." There are other conditions and obligations; but these will be found in the detailed statement elsewhere.

The Government Bill and Justice to Existing Gas Capital.

THE questions dealt with in the foregoing article will be incorporated in the Government measure; and therefore it will only complicate matters if they or their like are included in Private Bills. The same applies to the question of the revision of the sliding-scale terms and maximum prices. It is desirable that the greatest possible care should be exercised in this matter in the coming session. With a Government Bill in existence, it would be most inimical to the interests of the industry to have a number of Private Bills in Parliament dealing with the same question, because this would only result in the matters in question being referred to a Committee. This would certainly bring about a big contest; and—who knows?—there might then be modifications of the proposals of the Board of Trade which would not be to the liking of the industry, nor at all helpful to its capacity for service. It may be taken that we practically know now the future conditions of supply; but we do not know what will be the nature of the financial proposals relating to existing capital. However, the matter now having reached a position in which revision must be dealt with on a permanent basis, the Board of Trade could not in justice do less than secure to invested capital, which has been so hardly treated during the war, anything less than the pre-war dividend—particularly in view of the changed value of money. From the notice sent to us by the National Gas Council of a private and largely attended meeting of members held last Wednesday afternoon, at which the position was very fully discussed, it was resolved to recommend gas undertakings not to deposit Bills or notices of Bills in the coming session of Parliament, but to await the Government Bill. This course will give an open field to the Government measure, and will (if all undertakings adopt the recommendation) ensure that the industry at all events will do nothing to hamper the progress of the Bill. So if any gas undertaking promotes a Bill to deal with these proposals, it will incur a very heavy responsibility. When it is remembered that the President of the National Gas Council is also the Governor of the Gas Light and Coke Company, and that that Company is not moving to promote a Bill next session, although so heavily hit, there is good indication there as to the right course to pursue. It may not prove in the end to be the right one. But selection—more or less in the dark so far as revision of the sliding-scale and maximum prices go—has to be made now; and major opinion is that the course recommended is the less dangerous of the two. One other point. Some gas companies may regard it as imperative that they should make application to Parliament next session for further capital powers. Any company in this position should communicate without delay with the Secretary of the National Gas Council, as it is proposed to call immediately a meeting of such companies to consider the best procedure. A critical time in the affairs of an industry demands the utmost care.

Lord Moulton and Others on the Gas Position.

THE annual conference of the British Commercial Gas Association last week has marked importance for the gas interests. If there is any gas man—be his part administrative, professional, or commercial—who does not know where the industry stands, or what is its outlook, or what is his own duty at the present stage in our industrial history, the report of the proceedings will enable him to make good the deficiency. We cannot refer to the whole of the extensive proceedings in this part of the "JOURNAL;" but we may have other occasions for dealing with them. The present object is to emphasize certain outstanding features, some of which it would have been of advantage had they been addressed to a larger audience in which the public and our legislators had representation, instead of only to men whose interests are those of the gas industry.

The address of the President, Lord Moulton, was delivered extempore; and it was all that such a richly endowed intellect has encouraged us to expect. Mr. D. Milne Watson described it as eloquent and powerful, and remarked that his Lordship had spoken plainly to the industry. The industry is his debtor for doing so. No man who had not studied the position and the potentialities of the industry could have spoken as he did. Had he lived in it without any other external interests, he could not have delivered himself more accurately and directly. Those who listened hung upon his words. The shafts of wisdom went home; and we are confident they will reveal themselves again in intensified action within the industry. There is only one expression of his Lordship with which we do not altogether concur; but this may be because our interpretation of it is not quite so elevated as his own. He said the work that the Association does for the industry is the "domestic work." There is something belittling about the description, which does not harmonize with the rest of the fine references to the actual service the organization renders to both the industry and the community. Its sphere to-day is one which claims from it more application, more discernment, more skill, more vigour than ever before; and the future will require—well as all is done now—that the work shall be progressive. The work is of a dual character. It is, as the President puts it, research and the development, through educational effort, of the usefulness of the industry to the public. We call that something more than "domestic "work." Art and science are invoked by it. The success of the work has an equality in creating development with the work at the manufacturing end. The one cannot do without the other. The development which the Association succeeds in producing is that which is requisite to the best being done in gas production; and the best that can be done at the producing end supplies an instrument of enormous value to the Association, and to those whose work it is to sow, plant, and cultivate locally. There are many directions in which the services the industry can perform are only partially recognized; and the good that it can do is far from being exhausted—in fact, it would be difficult to place any set limits to it. The paper of Sir Dugald Clerk, and of the several other authors, prove this.

The industry is enjoined by the President to work for the maximum service within the opportunities made permissible by the times and circumstances. Until this is done, the industry will not have fulfilled its mission and its destiny. What does the maximum service mean? What does it cover? It means making the coal the industry uses as productive as possible; it means producing and supplying gas at the lowest possible rate; it means producing and making the utmost of the secondary materials yielded; it means putting gas at the disposal of all; and it means seeing that the gas-consuming appliances are such, and their use so ordered, that every calorie is brought into service. It is a big thing this with the performance of which the industry is charged. But it is necessary; and it will demand all our individual and organized energies to fulfil. It is an ideal this maximum service; but it must also be our objective. The outlook is excellent; but only work, and hard work, will produce realization. From the outlook, we see things as they are, and visualize prospects. But through human eyes and mentality, we cannot possibly realize finality. We have to work on, and on. Not even in what we regard to-day as the best types of carbonizing plant can we, as Sir Arthur Duckham says, assert that we have the ideal design. And this applies throughout our operations and activities. All this enables us to understand how much there is to be done; and the important place that the "B.C.G.A." has in the mechanism of the industry.

Lord Moulton is a progressive of the first water; but he believes in practical procedure. He has no sympathy with extravagant schemes in present circumstances. The fundamentals are in a disordered state; and upon such conditions we cannot build high or revolutionize developments in the industrial world. Everything is in an over-strained condition through the war; and there are, in his opinion, two things which must be done—one is for everybody to get back to work; the other to get back to where we were. The former one can readily agree with; the other must be governed by circumstances. And one industry that does not want to get back to where it was is the gas industry, because, in the first place, the war and current conditions have shown it how, with present plant, it can increase its productiveness to the advantage of the public, and assist in coal conservation to the benefit of national interests. Nor does it want to get back to the old financial terms, because they do not key with the new economic conditions. The industry can, as it has demonstrated, start right away on the road of progress, if permitted. The Board of Fuel Re-

search has acknowledged this; and their report on the conditions of development of the gas supply of the country is indirectly one of the most condemnatory documents, read in conjunction with the reported results of the work of Sir Dugald Clark and Professors Smithells and Cobb, of the Government action in narrowing its legislative facilities for development to electricity. It has been misinformed through its own limitations. As Sir Arthur Duckham has very truly said, there should, in the national interests have been an impartial, an unrestricted, and a far-reaching inquiry into the whole subject of light, heat, and power. If this had been done, the Government would have taken a broader view of what was necessary in the public interests. But now patch-work and disjointed legislation have to make amends for want of foresight in high places. The electricity scheme of the Government is condemned both outside and inside the electricity industry. The gas industry knows its strength if permitted to exercise it. It does not fear competition; but, looking at the matter nationally, combination of work would have been far better. This is a point the Government has missed; and it would not have been missed had it taken up the question of light, heat, and power in its entirety from the starting-point of coal conservation.

It is only of late years that the gas industry has itself found out its full strength. In the days of cheap coal, it was not making the best use of it; in the days of dear coal and shortage, it is doing so, within the limits set by plant conditions. And it has found out, too, that the gas it is capable of manufacturing under the new conditions is a gas that is highly serviceable to the community; and its power in the supply of a heating agent, detached from all the disadvantages of solid fuel, is to-day more unassailable than ever before. The thermal efficiency of our manufacturing processes is, in existing circumstances, as Sir Dugald Clerk showed in his paper, some nine times greater than that of the electricity industry; and what thermal energy is expended during manufacture has a large compensation in secondary products. Thermally considered, in lighting and power at the point of use, there is not much to choose between gas and electricity; but the efficiency is only based upon the B.Th.U. delivered to the consuming appliances, and does not take account of the cost at which they can be delivered. When this is done, economy lies with the gas industry, and will do so to greater extent in the future. In heating, electricity cannot approach anywhere near gas in thermal efficiency; and seeing that it already claims so great an efficiency based on heat energy delivered and not on coal consumed, it has not so much scope for development as has gas, which is so far ahead of it. Besides all this, the scope for business is extending, and must extend, as the President pointed out in his address. The industry must, however, have elasticity—not only in its manufacturing plant, but in other directions—if it is to render its maximum service.

In the meeting there was a great deal of a very cheerful character; but we have to work for realization. There was much good counsel, which must not be allowed to pass into oblivion. The industry was shown its new position. And conviction is strengthened that the best work of both individuals and organizations is needed; and not the least, but co-equal with the best of the rest, is that of the British Commercial Gas Association. There is much to be done, and earnestly done, as the active Chairman of the Executive Committee (Mr. F. W. Goodenough) showed when he spoke at the sitting on Wednesday morning.

Sir Arthur Duckham out for Better Collaboration.

THE division existing between gas engineers and the technical men engaged in the production of gas plant and appliances has frequently been commented upon in the "JOURNAL," and regret has been expressed at its existence. If we mistake not, a very definite movement to attempt to put an end to this ridiculous position is likely to develop; and Sir Arthur Duckham will take the lead in the matter. In this he will have our sympathy, and the utmost support that these columns can afford him. On several occasions he has alluded to the subject; and when a man does this, it is clear that it is not a transient thought, but that he has profound and settled convictions regarding it. Sir Arthur is foremost a gas engineer; and he does not want to see gas engineers lose the right to this title by the direction things are taking becoming permanent and comprehensive. It is because he is a gas engineer that Sir Arthur is also now a contractor. No one can deny that because he is a contractor, he is not a gas engineer. He developed from the one position into the other because there was larger scope for the gas-engineering faculties with which he is endowed. No one therefore is better qualified than he to take the part of protagonist in the movement for the fusion of the technical men of manufacturing firms and gas engineers. This is no mere whim to force the technical men of the manufacturers into gas-engineering circles. As a matter of fact, theirs is to-day very much the true gas-engineering circle; and there are many who profess and call themselves gas engineers who are not qualified to rank alongside them. The view is that fusion and co-operation are highly essential to maximum progress. This is putting the matter on a plane that must have cogent appeal and effect.

Sir Arthur is the President of the Society of British Gas Industries. At last Thursday's meeting he accepted the invitation to hold the office for two years; and the official position will provide the opportunity for prosecuting the endeavour to bring about better understandings and definite co-operative work. At the Society's luncheon, it will be seen that the President spoke very plainly on this subject. He is in a position in which he can form good judgment regarding it; and when he says that he deplores that the gas engineer (speaking of course broadly, knowing there are exceptions) is becoming less of a gas engineer every day, and more of a commercial man, he does so with a clear conscience that he is speaking truly. Now when he says this, it is not to antagonize gas engineers, but with the view of putting an end to the course of things, by gas engineers taking a co-operative part in design—blending their daily experience and their qualifications with the part the contractors' technical staff through their constructional experience and qualification has to take—so bringing to the credit and profit of the gas industry the highest attainable qualities and efficiencies in plant. This cannot be achieved without the two work together with this object. What is seen at the present time is that the gas engineer is depending more and more upon the contractors' designs for all sorts of plant and appliances—from the retort-house to gasholders. We might say they are not bad judges; but this would not be a sufficient answer to the claim and aim that the experience and qualification of the technical workers on both sides—the experience and qualification being obtained under the differing circumstances of one being the maker and the other the user of the plant and appliances—are necessary to the utmost perfection, utility, and efficiency. Some of the plant used on gas-works it would be difficult to improve; and it has (so to speak) become standardized. But in no direction is Sir Arthur prepared to admit—more particularly under the coming new conditions of manufacturing gas—that the scope for improvement is non-existent, by finality being already here.

There must, however, be a care. There are some gas engineers who are strong on fads, and who like to see them incorporated in their purchases. Many manufacturers find these men perfect nuisances, and squanderers of time and money. It is not these that the President of the Society has in mind. They are no good for his purpose, and have no legitimate place in his scheme for co-operation in improving design and efficiency. What they do has generally the very opposite effect, including an enhancement of costs. With the impending changes in gas manufacture, there should be more co-operation than ever. It could be done by admitting the technically qualified men of manufacturing firms into the ranks of the Gas Institution. There must be greater commingling, conference, debate, joint research, and so on. At the present time, any improvement in plant and apparatus to suit purpose is often brought about in a haphazard or accidental sort of way by casual suggestion or complaint of defects. Something more than this is wanted for the best progress; something more even than an annual visit of the Society to the Institution meeting with a paper is required. There must be intimate technical relationships, and liberal and close collaboration. This is what Sir Arthur is out for. We wish success to his enterprise, which is for the benefit of the industry, and not for individuals.

Small Gas Companies and Protection.

CONSIDERING that we have now a National Gas Council, it is marvellous what a number of matters there are in the gas industry that come within the province of the Gas Companies' Protection Association, and to which they can, being specifically organized for the purpose, specially

attend. The report which was presented at the annual meeting last Thursday, together with the address of the Chairman (Mr. Henry E. Jones), shows this. An industry subject to change and development, such as that of gas supply, cannot expect to avoid constantly arising problems relating to its rights, powers, and obligations. In these times, questions of the order watched over and dealt with by the organization appear upon the surface of affairs with a frequency that would be appalling were it not that it is well-known that alertness stands at the very head of the organization. Such alertness engenders confidence; and therefore it is one of the surprising things to us that the smaller gas companies have not responded before this to the appeal so often made to them by the Chairman, and emphasized by us in these columns, to link themselves up with the Association, on the special conditions offered them. We repeat the appeal to-day—not in the interests of the Association, but in those of the smaller companies. Under the present economic conditions, the lives of many of the smaller undertakings are at stake; and they will want all the succour they can gain by being associated, through organization, with the larger undertakings. Great things are developing inside and outside the industry; and if the small undertakings elect to continue a separate existence, they will be well advised to come under the ægis of the Association, and so gain all the support they can. But we are strongly of opinion that there will be good mutual advantage, to undertakings and consumers, by the amalgamation of the smaller undertakings to neighbouring larger ones. Experience proves this. The conditions to-day and those in prospect will prove it still more. The small undertakings will not be so favourably placed as the larger gas undertakings to work on the B.Th.U. basis, and under the conditions now agreed upon. We hear of returns from small gas plants which show, regarded thermally, that the production per ton of coal falls very much behind that of the more substantial undertakings; and it will be difficult for many of them to do much to reduce the difference. Then if electricity gains in strength from the new schemes, the resisting power in competition will not be so great with the smaller undertakings as with the larger ones. The latter, too, can take on the additional gas load with profit to their own working, which, though it may not be much spread over the whole, will be of public advantage. The small companies have very seriously to consider their position; but one of their first acts of prudence should be connection with the Gas Companies' Protection Association.

Massed Meetings.

A good many people during the past week have had occasion to say: "We do not like them." The dose has been almost beyond endurance. There were nearly two days' meetings of the British Commercial Gas Association, the National Gas Council had a meeting of pressing importance, the Society of British Gas Industries held their half-yearly meeting, the Gas Companies' Protection Association their annual meeting, the Midland Association called its members to Birmingham, and the Manchester Institution at the end of the week added to the already existing abundance. If we went back three or four days more, we could rope-in the Eastern Counties Gas Managers' Association and a couple of Junior Association meetings. The railway strike was partly to blame for this condition of things; and a desire to serve the convenience of members while in London was another reason. But when meetings follow one another in such quick succession, the good that one would do is largely blotted out by the crowd of matters that jostle one another; and there is not time left for the mind to give the various subjects proper consideration. So far as the overdose of meetings could not be avoided, criticism has no legitimate ground; but it is to be hoped the Councils and Committees of the different organizations will, when possible on future and more normal occasions, try to avoid (by consultation) an experience such as that of the past week.

Meeting Places.

The large Central Hall at Westminster is a beautiful place—to look at; but on a cold day at the end of October, with fuel economy the order of the times, it is not by far the best place for a meeting. At the "B.C.G.A." conference overcoats were worn, and coat collars were turned up. One gentleman defied the proprieties by putting on his hat. The acoustic properties of the hall are not of the best. Some of the speakers off the platform were credited with having double voices; and the Pressmen below were not at all certain whether they were reporting the human voice or the echo.

High-Pressure Gas for Street Lighting.

The Mayor of Westminster (Alderman G. W. Tallents), in opening the conference of the British Commercial Gas Association, referred to the high-pressure gas lighting of some West-end streets. His testimony is worth rescuing from the mass of other matter. In his opinion, quite the finest street lighting in the West-end is by high-pressure gas. As a member of the public, he regards Pall Mall as the best lighted street in London—possibly in the world. The light is admirably diffused. It is efficacious in lighting-up the traffic; and it is pleasant to the eye, which is something in a street. This is good independent testimony.

Calorific Power and Complaints.

Two or three prominent gas officials from the provinces last week stated that they had worked-down to the prescribed 425 B.Th.U. gas; but they had had so many complaints that they had had to get back to 450 B.Th.U., and then complaints dropped to the normal. The reduction in certain cases was in one step a heavy one; and it is not known whether pressures were at the same time reduced. The want of knowledge on the part of the consumers, too, as to regulation may have been responsible for part of the complaints with the lower calorific power gas. At the recent meeting of the Eastern Counties Gas Managers' Association, Mr. R. G. Shadbolt stated that he had found no difficulty with his consumers in dropping by 50 B.Th.U. at a time; and he was now working at 425 B.Th.U. and below. His evidence is confirmed by several other gas engineers.

Housing Schemes and the Foundrymen's Strike.

The question of housing schemes, and the equipment of new houses with gas appliances, had prominence at the meeting of the "B.C.G.A." last week. Meantime, the trouble with the moulders and the foundrymen continues. There are gas-stove makers who are only working from stocks of castings, and short hours are perforce ruling. Large orders are in hand for gas-fires and other appliances; and big demands for housing schemes are in prospect. Throughout the country the need for more production to rehabilitate its fortunes is the cry; but what matters this if industry does not toe the line chalked by the Unions.

Are our Gas Appliance Makers Behind the Times?

Writing for Messrs. Fletcher, Russell, and Co. on the subject of an editorial article, headed by the above question, in last week's issue, Mr. Arthur Forshaw, M.Sc., the Chief Chemist to the firm, partly blames gas officials for not taking advantage of the opportunities offered them by the makers of purchasing only those appliances that are provided with means of adjustment. Gas officials who have been guilty of this, in view of the changes in gas production, have been penny wise and pound foolish. Part of Mr. Forshaw's letter [which is published in our "Correspondence" columns to-day] is directed to advocating a "standard" gas. This is not a new topic with him. The final specification of the Board of Fuel Research, however, as to the quality of gas appears in this issue; and it is expected that it will shortly be incorporated in a Government Bill. Makers of gas appliances who have been pursuing the old paths will do well to note what is expected of them, act accordingly, and let the industry know that they are awake to the changes in gas manufacture, which will apply to every form of gas-consuming appliance that is made, and made by more than one firm. There are gas managers who complain that there are firms who do not stock certain gas-consuming apparatus with regulators attached; and inquiries have brought the reply that they can arrange to fit them to order! Only this week a gas manager told us that the ordinary suppliers of the boiling-rings he uses had not any with regulators upon them. Mr. Forshaw, whose letter we are very pleased to receive, has noted that we did not cast all the blame on the makers, nor did we suggest that all the makers are behind the times in respect of the changes in gas production. But there are concrete facts that cannot be disposed of by words.

Can This Be Beaten?

A letter which Mr. F. W. Goodenough read at the meeting of the Society of British Gas Industries last Thursday showed a

remarkable state of things at Bournemouth. The letter was from Col. Woodall; and it stated that 27,416 houses out of 27,428 houses in the Bournemouth Company's area of supply are furnished with gas services and meters. This only leaves twelve houses not in the fashion. There is not at present much scope there for getting new consumers on the books; the work has to be directed to securing new consumption for fresh purposes through the services in position—thus improving the earning power of the capital.

THE GAS STANDARDS AGREEMENT.

Official Statement by the Fuel Research Board.

WE have been asked by Sir George Beilby, on behalf of the Fuel Research Board, to give publicity to the following statement:

As a result of a conference between the consumers, local authorities, and gas undertakings, the recommendations of the Fuel Research Board have been accepted, with certain amends which are embodied in the following Memorandum:

First.—That the proposed system of charging the consumer for the potential thermal units supplied to him is accepted.

Second.—That the thermal units chargeable are to be calculated by multiplying the number of cubic feet registered by the consumer's meter by the declared gross calorific value of the gas per cubic foot.

Third.—That a calorific value of the gas is to be continuously measured and recorded by a recording calorimeter of a standard type, to be passed by the London Gas Referees. That the method of installing, using, and checking the standard calorimeter is to be prescribed by the London Gas Referees.

Fourth.—That, subject to the acceptance by the gas undertaking of the stipulations laid down in articles Nos. 1, 2, 3, 5, 6, and 7 [see "JOURNAL," April 29, p. 240], the gas undertaking is to be free to deliver to the consumer any mixture of combustible gases free from sulphuretted hydrogen, and not containing more than—

20 p.ct. of inert constituents for two years.
18 ,, ,, ,, for two years thereafter.
15 ,, ,, ,, thereafter.

Fifth.—The gas undertaking to declare the calorific value of the gas it intends to deliver, and to undertake to adjust, and if need be to replace gratis, the burners in consumers' appliances, with all reasonable speed, so that the gas delivered can be burned in these appliances with safety and efficiency.

Sixth.—Should the gas undertaking desire at any time to change the calorific value of the gas supply, due notice to be given to the consumers or their representatives. During the period of notice, preparations to be made by the gas undertaking for any re-adjustment of the consumers' appliances which may be required, so that the gas then to be delivered can be burned in these appliances with safety and efficiency.

Seventh.—The gas undertaking, within a period of five years, to supply gas at such pressure that, under normal conditions of supply and equipment, there shall be a pressure of not less than 20-10ths of an inch of water on the gas in any main or service-pipe of 2 in. diameter and upwards.

Eighth.—That the unit to be adopted in charging the consumer is to be 100,000 B.Th.U.

Copies of these resolutions have been referred to the Board of Trade.

GAS AND COAL (EMERGENCY) ORDER REVOKED.

LAST Friday's "Gazette" contained an announcement that the Board of Trade have revoked, as from the 28th ult., the Gas and Coal (Emergency) Order, 1919, dated Sept. 26 last, making provision for the purpose of maintaining and regulating the supply of gas and coal.

This Order, which made any excess of 425 B.Th.U. an offence against "D.O.R.A.," was given on p. 712 of the "JOURNAL" for Sept. 30. The revoking Order, however, does not make specific withdrawal of the letter from the Coal Mines Department of Oct. 6 and the Board of Trade instructions of Oct. 7, both of which were reproduced in the "JOURNAL" dated Oct. 14 [p. 73.]

Editorship of the "Electrician."—On Friday last, Mr. W. R. Cooper, M.A., B.Sc., &c., was presented by his colleagues with a silver rose bowl and a Weston portable milli-ammeter, upon his retiring from the editorial chair of the "Electrician" after a period of thirteen years. Mr. Cooper, who will devote the whole of his time to his consulting practice, was appointed Editor of the "Electrician" in 1906; and, under his editorship, the paper has made considerable progress. His place will be taken by Mr. F. H. Masters, O.B.E., who joined the "Electrician" staff in 1906.

NATIONAL GAS COUNCIL.

Wait for the Government Bill—Suggestions for Gas Undertakings in Pressing Need of Capital.

AT a largely attended meeting held at the Æolian Hall, New Bond Street, London, W., last Wednesday, it was unanimously agreed, after hearing a statement by the President (Mr. D. Milne Watson), and after full discussion,

To recommend gas undertakings not to deposit Bills, or notices of Bills, in the coming session of Parliament, but to await the promised Government Bill.

The proceedings were conducted in private and among the speakers were the following: The President of the Council in the chair, Mr. F. Barber, Mr. W. H. Bennett, Mr. H. E. Bloor, Mr. Wm. Cash, Sir George Davies, Mr. R. W. Edwards, Mr. J. H. Ellis, Sir Fortescue Flannery, Bart., M.P., Sir Daniel Ford Goddard, P.C., ex-Bailie George Henderson, Mr. F. H. Jones, Mr. J. H. Jones, Mr. C. S. Shapley, Mr. H. A. Thomas, and Mr. W. N. Westlake.

It was further arranged that any undertakings, finding it imperative to take immediate steps to raise further capital, should communicate at once with the Secretary to the National Gas Council, at No. 39, Victoria Street, Westminster, when a meeting of representatives of such undertakings would be called in London immediately to consider the best mode of procedure to be adopted.

PERSONAL.

A feeling by some of his old assistants and colleagues that they would not like Mr. S. Y. SHOUBRIDGE to retire from active service in the profession without showing in some small way their very high appreciation of his many kindnesses to them personally, and also of his great help to the gas industry, resulted in a dinner at the Trocadero Restaurant last Tuesday and the purchase of a tasteful gift for their friend. The testimonial was participated in by fourteen gentlemen who, at one time or another, had been either assistants to Mr. Shoubridge or connected with him on the engineering staff at Birmingham, Salford, and Lower Sydenham; and nine of them were able to attend the dinner. The subscribers included Messrs. J. W. Auchterlonie, L. G. Barber, Bretherton, F. Boardman, J. Bond, Kenneth Gandon, R. H. Garlick, Gregory, T. H. Hack, H. Kendrick, S. Meunier, J. W. Morrison, J. W. Whimster, and W. W. Woodward. Mr. J. W. Morrison, late of Sheffield, who, among those present, had had the longest accociation with Mr. Shoubridge, was in the chair. As a momento of the occasion, a small 17th century Italian bronze statuette (the subject being "The Disc Thrower") is to be presented to Mr. Shoubridge. Unfortunately, owing to the inscription not having been completed, it was impossible to do this at the dinner. Mr. Shoubridge was very much touched to think that his old friends and colleagues had not forgotten him.

Owing to advancing years and impaired health, Mr. J. G. HAWKINS has been compelled to resign the position of Manager of the Wisbech Lighting Company and of the Wisbech Water-Works Company, with which he has been connected for the past seventeen years; and the resignation has been regretfully accepted by the Directors. Mr. Hawkins went to Wisbech from Spalding, where he had managed the gas-works successfully for several years. Since he has been at Wisbech there have been considerable developments in connection both with the gas and the water supply, which have greatly benefited the district. The gas-mains have been extended to Elm, and outlying portions of the town. A new holder has been erected; and the production of sulphate of ammonia, tar for road maintenance, and benzol for war and motor services, were among the sources of income to which he devoted his attention. Other improvements were in contemplation. The Directors, as a mark of their great appreciation of Mr. Hawkins's long services, have offered to suggest to the shareholders his appointment as a director, thus retaining the benefit of his experience.

Sir RICHARD REDMAYNE, K.C.B., has relinquished the temporary position which he accepted in 1917 as Director of Production and Technical Adviser to the Controller of Coal Mines, and has resumed his permanent duties as Chief Inspector of Mines at the Home Office. Sir Richard has, however, consented (with the approval of the Home Secretary) to place his services in an advisory capacity, at the disposal of the Controller of Coal Mines with regard to pending legislation affecting the coal-mining industry.

Sir HENRY ALEXANDER MIERS, D.Sc., F.R.S., Vice-Chancellor of the University of Manchester, has been appointed by Order of Council dated Oct. 16 to be a member of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research.

The Chairman of the Lancaster Corporation Gas Committee, Sir N. W. HELME, was welcomed back last Wednesday, after six months' absence through illness. It was in the nature of a farewell, however, as he does not intend to seek re-election as Alderman. He has been Chairman of the Gas Committee for 25 years.

OBITUARY.

Last Wednesday the burial took place at Morecambe of Mr. WILLIAM DUFF, the former Gas Manager of the town, who died the previous week-end aged 77. He possessed wonderful vitality; and it was only a few months ago that signs of advancing age became apparent. For 35 years he was in the service of the old Morecambe Gas Company; and on his retirement in 1901, when the undertaking was acquired by the Corporation, he received £2000 from the Directors, and a presentation from the staff. Mr. Duff also claimed £5993 from the Corporation; and the Council offered £3871. The award by the Arbitrator was for £3800 and costs. He was succeeded as Manager by his eldest son.

Mr. JOHN SWAN, who had been Gas Engineer and Water-Works Manager at Ulverston from 1876 to June, 1918, and since that time retained by the Ulverston Urban District Council in a consultative capacity, died at his residence in Braddyll Terrace, Ulverston, on Monday of last week at the age of 68 years. His remains were interred at Ulverston Cemetery on Wednesday, amid many manifestations of regret that such a long service should have terminated. The deceased was born at St. Andrews, was educated at Madras College, Edinburgh, and became a gas engineer and architect. He received his first appointment with the Kingskettle and Ladybank Gas Company, and from there went to Maryport, and thence in 1876 to Ulverston as Engineer and Manager of the gas and water works. During his period of management, he constructed the Ulverston service reservoirs and filter-beds, and entirely reconstructed the gas-works. Owing to failing health he retired in June last year, but was retained as the Consulting Engineer. In this capacity he served the Millom and Cleator Moor Gas Companies; and he was a Director of the Grange and Cartmel Gas and Water Company. Deceased identified himself with many public movements and institutions in Ulverston, and was a personality in the old market town. He leaves a widow and adopted daughter.

Mr. JAMES W. LEITCH, of the firm of J. W. Leitch and Co., Ltd., chemical manufacturers, Milnsbridge, Huddersfield, died on Oct. 28, at the age of 47 years. He had travelled all over the Continent.

Vital Points for Association Work.

Mr. William B. Way, Secretary of the Natural Gas Association of America, has sent out to the members a letter asking them to consider a number of vital points of interest involving the welfare of the industry. Some of them apply only to natural gas, but most have a wider significance. Those applicable to general Association work are: The gathering together and dissemination of useful information concerning the gas industry. To further the friendly relations between all those interested in the industry, so that we may reach for, though we never expect to achieve, the ideal condition of all the interests existing and pulling together for the general good of the industry as a whole. To lend assistance and guidance in the matter of publicity, so as to prevent funds being expended on useless and ill-directed matter. The Association should be in a position to investigate and further the utilization of gas efficiently, both for domestic and industrial uses. It should use its best endeavours towards the crystallization of public opinion on the subject of gas. On the matter of legislation, the Association should not be used as a lobbyist; but it could assist in laying the true facts of the industry before the Legislatures, and give them an opportunity to think clearly on the subject upon which they were acting, rather than "to be guided by merely the howl of public opinion when not so justified." And last, but not least, the Association must look to its own life, and always be in a position to prove its usefulness and interest to all concerned.

Presentation to an Australian Gas Official.—A complimentary smoking concert was tendered to Mr. C. U. B. Gurnett by the officers and staff of the Australian Gaslight Company at the Highland Society's Rooms in Sydney on Tuesday, Sept. 2, to congratulate him upon his appointment as Secretary of the Company. Mr. H. A. Foskett, the Chairman of the Clerical Association, was in the chair; and the health of the guest was proposed by Mr. Andrew Wilson, the Chief Engineer. Mr. Gurnett, in responding to the toast, expressed his warm appreciation of the compliment shown him, and referred with pleasure to the help he had received from the whole staff since he had come among them.

German Tar Industry and Peace Conditions.—It is stated in the "Chemical Trade Journal" that the Tar Producers' Union in Germany have written to the "Kölnische Zeitung" that, according to the peace treaty, Germany must deliver 50,000 tons of coal tar a year to the entente countries. On the top of this, it is probable that (as a consequence of the transfer of territory) a considerable percentage of German coal production, and therewith tar production, will fall short. This means that, owing to the small production of coal, there will be a great decline in the production of tar. The German tar industry is not in a position to supply the inland requirements in tar products. The economic use of the quantities of tar still available is, therefore, an absolute necessity, along with a concurrent increase in its production.

TEMPORARY INCREASE OF CHARGES ACT.

FURTHER applications have been made to the Board of Trade for Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, by the—

Barnstaple Gas Co.
Bexhill Gas and Water Co.
Brentford Gas Co.
Broadstairs Gas Co.
Bungay Gas Light Co.
Cannock, Hednesford, and District Gas Co.
Canterbury Gas and Water Co.
Cardiff Gas Light Co.
Colchester Gas Co.
Colwall Gas Co., Ltd.
Crowborough and District Gas Co.
Dronfield Gas Light and Coke Co.
Dunstable Gas and Water Co.
East Worcestershire Water Co.
Edenbridge and District Gas Co.
Farnham Gas and Electricity Co.
Farnham Water Co.
Great Marlow Gas Co., Ltd.
Kingston-upon-Thames Gas Co.
Kirkham Gas Co.
Lampeter, Llandyssul, Tregaron, and Aberayron Gas Co.
Littlehampton Gas Co.
Mirfield Gas Co.
Newport (Mon.) Gas Co.
Rainhill Gas and Water Co.
Runcorn Gas Co.
Sheffield Gas Co.
Southgate and District Gas Co.
South Kent Water Co.
St. Austell Gas Co., Ltd.
Taunton Gas Light and Coke Co.
Tonbridge Gas Co.
Tottenham District Light, Heat, and Power Co.
Wadhurst and District Gas Co.
Wetherby District Water Co.
Wicklow District Gas Co.
Wrexham Gas Co.

The Board have made Orders under the Act in favour of the—

Abergele Gas Coke and Water Co.
Beccles Water and Gas Co.
Brentwood Gas Co.
Carmarthen Gas Co.
Cork Gas Consumers' Co.
Dorking Gas Co.
Drighlington and Gildersome Gas Light Co.
Felixstowe Gas Co.
Fleetwood Gas Co.
Frome Gas Co.
Garstang Gas Co.
Hastings and St. Leonards Gas Co.
Hayfield Gas Co.
Hessle Gas Co.
Holyhead and North Wales Gas and Water Corporation—
Holyhead Order.
Llanfairfechan Order.
Llangefni Order.
Llanrwst Order.
Pwllheli Order.
Hoylake and West Kirby Gas and Water Co.
Isle of Wight Water-Works Co.
Kenilworth Water Co., Ltd.
Liverpool Gas Co.
Liverpool Hydraulic Co.
Midsomer Norton Gas and Coke Co.
Newport (Mon.) Gas Co.
Oakham Water Co.
Prescot Gas Co.
Queenstown Gas Co.
Quorndon and Mountsorrel Gas Co.
Redhill Gas and Water Co.
Rothwell Gas Co.
Seaham Gas and Lighting Co.
Sedbergh Gas Co.
Shanklin Gas Co.
Stroud Gas Co., Ltd.
Sutton District Water Co.
Syston and Thurmaston Gas Light and Coke Co., Ltd.
Thirsk Gas Co.
Welwyn, Knebworth, and District Gas Co., Ltd.
Wexford Gas Co.
Worthing Gas Light and Coke Co.
United District Gas Co.

The Board have issued notices varying the prices which may be charged under Temporary Increase of Charges Orders granted to the—

Alliance and Dublin Consumers' Gas Co.
Barnard Castle Gas Co.
Bishops' Stortford, Harlow, and Epping Gas and Electricity Co.
Bordon and District Gas Co.
City of Chichester Gas and Coal Co.
Crediton Gas Co.
Deal and Walmer Gas and Electricity Co.
Dover Gas Co.
Ely Gas Co.
Falmouth Gas Co.
Folkestone Gas and Coke Co.
Godstone Gas Co.
Gorleston and Southtown Gas Co.
Hexham Gas Co.
Horsham Gas Co., Ltd.
Long Melford Gas and Coke Co.
Lowestoft Water and Gas Co.
Maidstone Gas Co.
Shrewsbury Gas Light Co.
South Metropolitan Gas Co.
South Suburban Gas Co.
Swansea Gas Co.
Tadcaster and Wetherby District Gas Co.
Tipperary Gas Co.
Wakefield Gas Light Co.
West Cheshire Water Co.
Westhoughton Consumers' Gas Co.
Wollaston Gas Co.

The Board have revoked previous Orders and made new Orders in the following cases:

Crediton Gas Co.
Bordon and District Gas Co.
Gas Light and Coke Co.
Herts and Essex Water-Works Co.
Liverpool Gas Co.
Southend Water-Works Co.
South Staffordshire Water-Works Co.
Staffordshire Potteries Water-Works Co.

The following further list of applications has been made to the Ministry of Health:

Ashford Urban District Council.
Cleator Moor Urban District Council.
Cockermouth Urban District Council.
Shipley Urban District Council.

Woodall-Duckham Retorts for Portsmouth.

The Portsea Island Gas Light Company have entrusted the Woodall-Duckham Company, Ltd., with an order for a further installation of vertical retorts, which will be erected at their Hilsea works. This new installation will consist of seven standard settings, each comprising four five-ton retorts; and the plant will be complete with wagon-tippers, coal-handling arrangements, a telpher and track for dealing with coke, coke-screens, and a large gas driven electricity generating plant.

The first visit of the session of the Scottish Junior Gas Association (Eastern District) will take place on Saturday next, to Newbattle Collieries, Newtongrange. The Lothian Coal Company will entertain the members at tea.

On Thursday evening of this week the Midland Junior Gas Association will hold a meeting, at which Mr. R. A. S. Browning, of Nechells, will read a paper on "Gas-Works Problems and their Solution." On Saturday afternoon members will visit the Pensnett works of the Stourbridge Refractories Company, Ltd.

BRITISH COMMERCIAL GAS ASSOCIATION.

EIGHTH ANNUAL GENERAL MEETING AND CONFERENCE.

THE eighth Annual General Meeting and Conference of the Association was held on Tuesday and Wednesday of last week, in the Central Hall, Westminster, under the presidency of the Rt. Hon. Lord Moulton, P.C., K.C.B., F.R.S., whose address was listened to attentively by a large and representative audience.

A WELCOME.

The meeting having been called to order,

Alderman G. W. TALLENTS (the Mayor of the City of Westminster) said it gave him the very greatest pleasure to have this opportunity of welcoming the British Commercial Gas Association on behalf of the City of Westminster. He thought that Westminster might be considered to be a particularly suitable place for a gathering of this kind. They had in Westminster very intimate relations with the gas industry; for in its very heart was the chief office of what he thought he might without offence call the premier Gas Company of England—the Gas Light and Coke Company; and if they went about the streets of Westminster in the evening, they would have an opportunity of observing street lighting in almost every stage of its development. The Westminster City Council, of course, were desirous simply to get the best and cheapest light for the public, whether that be electricity, or whether it be gas. But, speaking for himself as a humble member of the community, whose business it was to frequently go about the streets of Westminster, he had no hesitation in saying that, in his opinion, the finest street lighting they had there was the high-pressure gas-lighting, of which they would see examples in Pall Mall and other places. It was very curious that he should have mentioned Pall Mall, because he was reminded shortly before the meeting that Pall Mall was the very first London thoroughfare that was lighted by gas; and it was strange that the same street should be to-day an example of what he again (speaking not as an expert, but as a member of the public), considered to be the best lighted street in London—possibly in the world. The light was admirably diffused. It was efficacious in lighting-up the traffic; and it was pleasant to the eye, which was something in a street. But, as they knew, it was not only a question of external lighting for which gas might be suitable; much more important were its uses for internal lighting and cooking, and purposes of that kind—among other things, for the vast development of working men's dwellings, which they were promised, and which would come in course of time. He must not forget—none of them could really forget—that during recent years the gas industry had rendered national service in a very different direction. They were fortunate in having Lord Moulton to-day in the chair. ["Hear, hear."] He must say, what he most earnestly believed to be the truth, that no man rendered greater service in the war—certainly in connection with high explosives—than did Lord Moulton. [Applause.] They were fortunate in having him with them, because he would be able to tell them, and to tell the public, what the public ought to know—but he was not quite sure that they realized yet—the truly enormous services which the gas industry performed for the country at all stages of the war, and particularly in the critical early stages. The amount of raw material which they were able to supply for high explosives, almost (he thought he might say quite) saved the situation. He believed, speaking from memory, that Mr. Milne Watson, presiding at a recent meeting of the Gas Light and Coke Company, remarked that his Company alone supplied enough "T.N.T." to fill 160 million 18 lb. shells; and that if the supplies which came from other gas undertakings were added, he thought this figure might safely be multiplied by five or six. Now, the public ought to learn this from a person who spoke with the authority of Lord Moulton. But the gas industry was a national necessity, not only in war but in peace; and it was essential that this industry should be able to be carried on in circumstances which would attract to it a sufficient supply of capital to maintain it in an efficient and progressive condition. Nobody, he took it, wanted to quarrel with the principle of the sliding-scale, by which dividends should vary inversely with the price of gas; but it was equally obvious that a sliding-scale framed years before the war was now altogether out of date, and was a cruel hardship upon the gas industry. ["Hear, hear."] Only Parliament could alter this; and he had good hope that it would be altered before long. He trusted this conference, which included so many gentlemen who could speak with real authority on the question, would not be without its influence upon the decision of Parliament in this matter. He felt that he had stood between those present and the proper proceedings of the conference almost too long; but he would like to repeat that he did give them a most hearty welcome to the City of Westminster, and wished all success to the work of the conference.

APOLOGIES FOR ABSENCE.

Mr. F. W. GOODENOUGH (Chairman of the Executive) said that in the unfortunate absence owing to illness of the Secretary (Mr. W. M. Mason), he had to read several letters regretting inability on the part of the writers to attend. The Lord Mayor of London trusted that much good would accrue to the community as a result of the discussions upon coal conservation, smoke abatement, and housing, in all of which the citizens of London are deeply interested. The Lord Provost of Edinburgh remarked that they all fully recognized the national and domestic importance of the problems which would be under discussion. The Lord Provost of Glasgow declared that he attached great importance to the work that the Association are doing. The Lord Mayor of Manchester sent best wishes for the continued success of the Association, who are doing valuable work for the industry.

LORD MOULTON'S ADDRESS.

Lord MOULTON then proceeded to address the conference as follows:

I am sure that I shall be speaking, not only in the name of you all, but with the hearty approval of you all, when I thank the Mayor for his cordial and courteous welcome to the Association to his domain of Westminster. I think that Westminster as a municipal entity rivals in importance even the old authority of the City. It claims to be a city even, I believe, as old as London itself. It has always been represented in a way which has been worthy of its position as a municipal authority; and it is pleasant to find that, when we come here, choosing a place as being the most suitable for a central meeting, we come among friends.

Now, gentlemen, you have done me the honour of making me your President. I have been President of other great bodies belonging to the gas interest; but in the case of no one of them have I felt it more an honour than I do to speak to you to-day. For, though I realize the greatness of the work which they are doing for their industry, and for the public, there are other societies dealing with other interests and other services of the same type. Your Association is of a very peculiar type, and one that I should like to see repeated in many different spheres. You are one of the earliest, if not the very earliest, of the societies formed by the totality of an interest for purposes of research and for developing the usefulness of which the gas industry is capable. I think that it shows, too, foresight on the part of the industry that, throwing aside all questions of jealousy or of pride in individual work, they should subscribe to a Society whose business it is to bring home to every portion of the industry all the knowledge that is possessed by any, and, what is more, to do the tedious and unexciting, but absolutely essential, work of teaching the public the value of the industry, and how they ought to take advantage of the services it can render. ["Hear, hear."] It is a real honour to a man like myself, who has lived in almost adoration of research all his life, and who has realized how much the world misses of the good that it can easily partake of, by means of the purblindness of ignorance, to stand as the President of a Society that has no enormous programme, but whose one aim is to render more efficient an industry, and make that efficiency more appreciated and more available by the public which it serves. My entrance into this peaceful industry was entirely by war. I had known of the inventions which have played such a great part in shaping your daily work, and I had had a litigious acquaintance with many of them; but it was war which first taught me the real value of your peaceful industry.

THE INDUSTRY AND THE WAR.

I remember the early days in 1914 and 1915, when it seemed as if we should be hopelessly inferior to our well-equipped foes in the matter of munitions. How I got the heads of your industry—those to whom you look up most—to come and teach me what the resources of the nation were, and how I could best get the mastery of them. It was due to the fact that I got my information direct from those who had spent their lives in the practice of your industry, that my arrangements were not only completely effective, but I believe I may say gave rise to no friction whatever during the whole of the anxious period that we lived through until the armistice commenced. ["Hear, hear."]

That is of itself no small thing; for what you dread most when you are trying to press on a work with all speed is the friction that accompanies rapid action. Someone has said that there is nothing which can hold back an Atlantic liner, except a handful of sand. This, put in a judicious place to create friction, will do more than any other power. So it is in the work of mankind. When you have to do a thing rapidly, almost ruthlessly, it is of infinite value that you should have the wise counsels of those who are intimately acquainted with the peace aspect of that with which you are interfering, and who will teach you how to do it, not only most efficiently, but also with the least friction and trouble. That introduction to your industry has been a very fruitful one.

THE DOMESTIC WORK.

I have had the honour of being President of great societies dealing with the big problems that face the development of gas; and now I come to what I might call the Society that does the domestic work. You may be a devotee of science; you may spend your life in developing it; but, in order that your strength should last, and that your labour should be successful, it needs

somebody to do the domestic work—to see that nothing is wasted, that things are in their place, and that as soon as you have done your work it will get into real use. Now, your Association does that, thanks to the funds subscribed by the broadmindedness of what I may call the whole of your industry. It does it in many ways. The two broad lines which it follows are, first, encouraging research, giving funds for the special researches planned out by those who know the industry intimately; and also the equally important work of teaching the public what your industry can effect, and with all tact, but with never-failing industry, showing them how to take advantage of this—making them feel what services you can render.

This is work which is often called by a name which is unpleasant to our nostrils after the experience of the last five years—"propaganda." It is not at all a suitable name; and it really should be baptized again. The teaching of people the value of things, the making widely known the experience of those who have studied the matter, is something that deserves a more kindly name. But whatever name you choose to employ, the thing itself is equally useful and equally important. I have been delighted to see when perusing the publications which you issue, that this work is carried on by your Association in the best of ways—pointing out what can actually be done, not by means of epithets, but by means of direct information. Information that can be verified by the customer at once, if he chooses to do so. It is based solely on fact; and as long as this work goes on, you may be assured that any success obtained is not transitory. You know it is particularly necessary for the gas industry that this work should be done. If you think of the services which at the present time it is rendering in all forms of domestic usefulness, and reflect that all the time it has been in existence it has been ready to render these services, and yet they come upon us as novelties, you will realize what a blighting effect on usefulness has this simple fact, that people do not know that it is possible to use gas in a thousand-and-one ways.

KEEP ON WITH THE GOOD WORK.

The gas industry, as I have said, particularly needs this work, because it is an industry which is put in a special position. By reason of the fact that it is rendering public services, it is safe from competition. It has rules in regard to the return it may take from its work in the shape of dividends, which were stern, though they were, I think, wise, but which now, of course, have become absolutely out of date—crying out, as a matter of justice, for their complete revision. Being put in the peculiar position to which I have referred, the real impetus and stimulus of the industry came not from that which ordinarily urges on business—that is, simply a question of profit. It did recognize, and ought always to have recognized, that it should have a high standard of duty, in the way of rendering the maximum public service. It had not, as I say, any competition. This arrangement was necessary in order to guard against useless waste of capital; but it made it encumbent upon those engaged in the industry to take a high view of their duty of developing it to the utmost, under the stimulus and with the aim of making it more useful to the public. They have done so; for the industry has a very fine past—especially in late years.

But even now, as we look round and we see the work that the Association has done, we realize that it has not as yet exhausted the good it can do to the public. There are many, many directions in which its services are only partially recognized, and partially made use of. The Association deserves the support of you all; and it must, if you are going to hold the community as your friends, make all that gas can do family words. You must not be satisfied until you believe that you have done your best both to render services and to get them accepted. [Applause.] Now, this is specially encumbent on you at the present crisis, during the wild moments of national dreams. During the war nothing was more remarkable than the projects for enormous development in every possible direction of industry, to which was applied the very unsuitable term "reconstruction." After the war, when the nation was discovered to be lying under a crushing burden of debt, when its people had lost the steady habit of monotonous and continuous work on which all successful production must be based, it was found that what was wanted to be reconstructed was not these great edifices which were sketched out by hopeful theorists, but the foundations of industry. You had to get back to the state of being steady producers before you could hope to attain to the extensions which have formed, I may say, the sole subject of these discussions during the war.

A MESSAGE TO THE WORKERS.

Now, when I look round at the industrial world, I feel that the most serious thing is to tell the over-strained British public—a large proportion of whom have been through the agony of actual service in the field, while the others have gone through the agony of feeling that those dear to them were being exposed to death—that England has come out of the convalescent chamber, and has got to go back to everyday work. One of the most fascinating essays of Charles Lamb relates to the change of view of the sick man as he gets better. As a sick man, he was the universe. Everything had to give way to him. His wants were commands. People walked about the room on tiptoes, in perfect silence. He felt that all around him bowed to him, as though he were a supreme king. Then he begins to get better, and he finds that less and less of this concentrated attention does he receive. The universe over which he seemed to reign gets smaller and smaller. Even in his own chamber there is not the awe-struck respect for his needs that there used to be; and gradually he comes out of his sickness to convalescence, and then a well man, and finds he has stepped down from his throne, and is an ordinary worker.

That is what England has been going through; and it has got to learn the lesson that, though its men have performed such prodigies of valour, and though our gratitude to them will never fade, yet they have to come back. The nation has come back from war to peace; and now though the men have the right to look back upon the time when they were everything, and the nation depended on them absolutely, they have to realize that once more they have become workers, and that work has to go on with all its relentless uniformity, just as it did before the war, just as it would do if there were no such thing as war. It is not ingratitude, but it is the necessity of ordinary life, which makes us realize that we have all got to come back to plain steady work. [Applause.] This is why, to my mind, the present moment is not one for exaggerated schemes for the higher development of the industrial world. The first thing to do is to get back to where you were, and, learning all the lessons of the past, still to realize that we were great producers in the olden time. The lines along which production went on must have had much to recommend them; and though we may in detail, and to a certain extent in broad outline, vary them with advantage, it is not the moment to launch out into expenditure for revolutionizing industry, but a moment when, not only has the country no money whatever to spare, but it has mortgaged deeply, almost crushingly, all that it possesses.

ELECTRICAL DEVELOPMENT.

I am referring to this, because we are threatened with huge schemes for the development of electricity on lines utterly strange to us, and on a scale—I might almost say, with monopolistic features—which never have commended themselves to the English people. Whether or not the nation will have learned wisdom—the wisdom of not spending money that it has not got—I cannot say. But I tell you my attitude. I tell it to you people whom I look upon as those who are thinking most intimately and most earnestly of the development of your industry. I want to tell you that the development of electricity delights me just as much as the development of any other valuable industry, and that I am in no sense the enemy, but am the warm friend, of that development. I see the means that it gives to industries to simplify and sweeten their works, by the better distribution of power, and in many other ways.

But what I do feel keenly, from my study of the gas industry, is that in all these schemes the eyes of the would-be reformers are fixed on some hoped-for result; and they have never studied what there is that can do for the public what they profess to be able to do. A great deal of the success of their propaganda has been by throwing into the shade the work that can now be done with capital already invested, with skill already obtained, and with no delay for the purpose of preparing new plans and new works. We are not justified in treating electricity hostilely in any way. It has put a standard before you in the matter of the distribution of motive power and the distribution of light which it will take you all your energies to equal. The race is very level just at the moment; and in certain forms of generation and distribution of power, gas could never touch the gigantic installations which electricity can so easily make.

THE POSITION OF GAS.

Your position has ascended to much safer ground than merely a question of supplying light. We have realized, and we have got to make the public realize, that your position is that you possess an unrivalled power of distributing heat so that it can be used economically. Used for what you like—used for power, used for light, or used for what is really more important than either of these, for warmth in houses for domestic purposes. Even with all their promises, the electrical people cannot pretend to hand over a calorific value of one-fourth compared with what you can do. If we look at what is being done—which, after all, is safer when you are thinking of making great changes—we find that you have the power to put into a household, in the invaluable form of a gaseous illuminant, six times as large a proportion of the calorific value of the coal which has been used to generate either the gas or the electricity as the case may be. That is the position which we have learned to be the real strength of the gas industry. The gas industry was slow in getting to it, because until electricity came along it relied mainly on supplying light. That is, after all, only one of the forms in which its services may be of value to the public. The true position is that it is a great distributor of heat in the form of a gaseous medium. This is a position which stands unassailed.

No doubt claims were made which challenged it; but these claims have been demonstrated to be unsustainable; and for cooking and heating, and many things of that kind, you have the unassailable position of being the one possible rival to the wasteful domestic fire. Nobody doubts its wastefulness; and alone you can remedy this waste. So I am glad to see the position which the army of the gas industry has taken up is more and more based upon this great claim; and I think that the business of this Association in making clear, not to big audiences necessarily, but from householder to householder, that what he gains by taking gas and using it as a great heating agent, will react on the waste of coal which is going on at the present moment,

until Coal Conservation Committees will not look to electricity as the solution of the great difficulty of conserving our coal resources, but will feel that an appreciation of the use of gas in all its forms is the most potent weapon at their command. This quiet movement among householders, and among the industries that can also avail themselves of it, is going on admirably under the ægis of your Association. You have loyal services indeed rendered to you under the guidance of those whom you have put at the head of your various departments. Mrs. Cloudesley Brereton has done work for you which could not be more admirable.

But remember that if you take this as your recognized position, you must be careful that you yourselves have found out all that is to be known of the uses of gas as a heating agent. You have got to take care that your cooking apparatus and your heating apparatus are such as to take advantage of the last calorie. You must have this studied, and not only the problem solved, but the solutions known to you and to everyone, if you are going to make the most of your position.

GAS FOR TRACTION PURPOSES.

I think the report of the perfectly independent Committee on the use of gas for traction purposes is one that should be studied by you all. I can assure you it is the only thing that can defend you from the almost monopoly of the great oil companies. Mechanical traction has seized the whole of the world, but nowhere is its grip so strong as in England; and at present—and I am afraid we always shall be—we are in the position that we cannot get the liquid fuel for mechanical traction in this country, except from the gas undertakings and others who distil coal. It will probably be quite insufficient; but there is a practically limitless supply of that which, unless the price of petrol falls to a low standard, can answer effectively the same purpose—that is gas. Now that we are beginning to see the cost and the burden of fixed tracks along the roads of our cities, it is quite possible that the flexible motor bus will develop largely; and, if so, unless the price of petrol keeps low, they will have to come to the quiet and useful gas industry for the solution of mechanical transport. It will open up a world of employment to you.

COKE COMING INTO ITS OWN.

Then I see that the despised coke is coming into its kingdom. People are realizing that it was only ignorance of the proper way of bringing out its qualities and using its full efficiency that made it a kind of "Cinderella" among fuels. The results of trials scientifically carried out, based on a study of its properties, are most encouraging.

I mention these as only two of the recent results of the more concentrated study of what the gas industry is able to do. They show that its power of rendering services to the public is greater than has been thought of; and remember that, so long as you go on building on the sound foundation of usefulness to the public, you have got no foe to fear. Therefore I may, in conclusion, urge you to support, not only by money (for as far as I can see you are liberal enough to meet the expenses of an Association like this), but with your attention and your hearts, the work of the Association. Make it your business to learn to the last letter all the advances that are taking place in the application of gas, and all the advances that are made in the better production of it, in order that you may show that the industry to which you are proud to belong is after all the one that chose in these early days the best way of rendering good service to the public. [Applause.]

A VOTE OF THANKS.

Mr. D. MILNE WATSON said it was his pleasant duty to move a very hearty vote of thanks to Lord Moulton for his illuminating and powerful address. They were not, he was very glad to say, strangers now to Lord Moulton. He had been President of the Society of British Gas Industries and of the Institution of Gas Engineers; and now he had honoured this Association by becoming their President. He could assure Lord Moulton that they very highly appreciated the fact that, in the midst of a busy public life, he had been prepared to devote so much time to their affairs, and to deliver such a fervent and stirring address as they had heard that day. ["Hear, hear."] It showed that, at any rate, he was a believer in gas. Lord Moulton had been through the mill with them during the early part of the war; and he had told them, in language which could not have been rivalled, of the great services which the gas industry had performed to the nation in those early days of 1914-15, and had said that, unless the industry had played its part then all would have been lost. They did not want to "blow their own trumpet;" and they were particularly glad therefore when a trumpeter like Lord Moulton came and told the public, through the Association, the truth about the industry. They had suffered too long from being considered the "Cinderella" of the industries. The presence of a gentleman like Lord Moulton in the chair of their Association would do a great deal to dispose of this ridiculous idea. He did feel very deeply the debt of gratitude they owed to him for coming and speaking plainly to them. They did not want to be flattered—they wished to know the truth; and it was a good thing to hear a plain statement as to their duty, and as to the course they ought to follow. Therefore they all appreciated the address because of its straightforward counsel. They had very difficult days in front of them. The whole future of the industry was in the melting-pot at the present moment; and they welcomed Lord Moulton's help. They were thankful to him for his assistance in the past and for his address that day; and they would look forward to many services from him in the future.

Mr. H. E. JONES said he had great pleasure in seconding the vote. He had known Lord Moulton even in his litigious days, and then learned to admire his great gifts. In connection with his position as head of the High Explosives Department, he had referred to his own work as having been almost tyrannical. It might have seemed to him tyrannical; but the gas industry was very glad to help him. Of him it might be said that he "touched nothing that he did not adorn." In every direction he had done excellent service. An inspiration came to him when he recognized the gas industry as being able to help in the high explosives field. It was only when he called them together, and they availed themselves of his good advice, that they did the great work which Lord Moulton, so frequently and so justly, had acknowledged in such forceful words as had put them before the world in their proper light. He rendered them one of the most important services when he took the chair of the Institution of Gas Engineers, because in his very brilliant address there he indicated the necessity there was, if they were to do their best for the community, that they should be liberated from some of the trammels which then held them, not to an ideal, but to restricted manufacture, possessing qualities which were not those which developed their best capabilities. What was said in that address might be behind the modification which was now taking place, and which was familiar to them all under the name of the Beilby report. By this, if only they could preserve themselves from any trammels, and from any fantastic restrictions, they would be able, as they had never yet been able, to distribute their coke—the bugbear and eyesore of their works—that was, as a gaseous fuel. The liberty that was conveyed to them by the notification of Sir George Beilby was one that would be enormously fruitful, and in the very direction that their learned President had indicated some few years ago. With all this in front of them, he thought they had many things for which to thank Lord Moulton. Not the least of them was the fact which he had just enunciated in his address—and it was to be hoped that the lesson would be taken to heart—that the time had come for a return to every-day life, and that every man must produce more than he consumed, or he would not be a faithful citizen of the State.

The resolution was carried with applause,

The PRESIDENT said the vote of thanks was quite unnecessary. The members had really given it in the only way in which an audience could effectively give it—that was, by their attention. He had been struck by the manner in which they had all listened to what he had said. It seemed to him to contain nothing new—but the gas that they produced contained nothing new. The great thing was to make that which was appreciated; and the object of the guiding idea of his address was to make them appreciate things they did know, and to make them see how important it was that the whole public should realize them. He had now to call upon a very old friend, Sir Dugald Clerk, to open a debate.

COAL CONSERVATION.

Sir DUGALD CLERK, K.B.E., F.R.S., then delivered an address on "Coal Conservation." This, with the remarks by which it was followed, will be found on pp. 243-7.

THE SMOKE NUISANCE AND HYGIENE.

At the afternoon session, there were four addresses—by Dr. C. W. Saleeby, Dr. Harold A. Des Vœux, Prof. Leonard Hill, M.B., and Dr. Samuel Rideal—bearing on questions of gas in relation to health. Pressure upon our space, however, prevents notice of these now.

Mr. GOODENOUGH said that Lord Moulton had been called away on important business; and the chair was taken by Sir Percy K. Stothert, K.B.E.

THE SECOND DAY'S PROCEEDINGS.

ALDERMAN F. S. PHILLIPS, OF SALFORD, IN THE CHAIR.

Mr. F. W. GOODENOUGH (Chairman of the Executive) said he had to express on Lord Moulton's behalf his regret that he was unable to be present, owing to important Government business. It was very good of him to have given up so much of his time on the previous day. In his absence, Alderman Phillips had kindly consented to take the chair.

The Scrutineers had reported that Sir Robert Hadfield, Bart., had been duly elected President for the ensuing year; and he had to express Sir Robert's regret that absence abroad prevented him from being with them that day, to thank them for what he regarded as the honour of his election. Further, he (the speaker) would like to express regret at the absence of Mr. Mason, through a rather nasty illness, from which they hoped he would speedily recover. No doubt the members would wish to send him a message of goodwill and wishes for rapid restoration to health.

The CHAIRMAN remarked that he was sure they were all in agreement with the sending of such a message to Mr. Mason. They were exceedingly fortunate in his services to the Association, and trusted he would soon be well again.

ANNUAL REPORT AND ACCOUNTS.

The following report to the Committee was then submitted to the meeting.

Eighth Annual Report of the General Committee.

INCOME.

The income for the year was nearly £1400 more than in the previous financial year, in spite of the fact that the amount retained by the Institution of Gas Engineers for the important research work they have in hand for the industry—namely, £1778—was £621 more than in the previous year, and double the amount so retained two years ago. The rules of the Association provide that not more than 10 p.ct. of its income may be devoted by the Institution to such research and other special purposes; and the Institution have during the past year for the first time found it necessary to retain the full percentage and to obtain further assistance from the National Gas Council.

The increase in income is largely due to the addition to the list of subscribers of 62 undertakings—a larger increase than during any year since the outbreak of war. Subscribing undertakings now total 609, as compared with 253 at the foundation of the Association.

EXPENDITURE.

Administration expenses show the substantial increase of £624, occasioned largely by war conditions, but also partly by the increasing amount of work falling upon the Secretary and his staff, which it has been necessary to augment. The total expenditure under the heading of "Administration" now represents just under 10 p.ct. of the total income, as against 6 p.ct. in pre-war years. This increase in percentage is due to the fact that, while the altered value of money has necessitated increased expenditure on salaries, printing, stationery, &c., no adjustment of income has been made to meet the reduced value of the pound sterling.

The expenditure on publicity (including that under the heading "Services Rendered," which is now shown separately, but was previously included under "Publicity") shows an increase of £2500, of which £1400 was drawn from the "After-War Campaign" account. The increased expenditure represents, however, a reduced amount of advertising space occupied, as the cost of such space has risen substantially as a result of the war.

The increased cost of producing the "Bulletin" has made it necessary to raise the price charged for that publication—an increase which has been readily agreed to by the subscribers. It is hoped that all members will adopt the practice already followed by many, of purchasing regularly for circulation to the members of the Boards and Committees of their undertakings, copies both of the "Bulletin" and of "A Thousand and One Uses for Gas."

PUBLICITY WORK.

Publicity during the year has been largely centred upon the two questions of housing and fuel conservation. Steps have been taken to make widely known the facts as to the relative thermal efficiencies of gas and electricity, and the effect upon the nation's coal resources which would result from the use of electricity for fuel purposes. There is reason to believe that this propaganda has had considerable effect, and has done much to ensure the establishment of gas as "The Fuel of the Future."

A number of publications have been issued dealing with the Housing Problem, including special numbers of "A Thousand and One Uses for Gas;" a special memorandum giving particulars of Government Housing Schemes in which gas has been adopted; a memorandum setting out the case for gas in relation to the Housing Problem; and a reprint of articles dealing with the Economies in Building Construction rendered possible by the use of gas for heating.

A model gas house was shown by the Association at the Model Homes Exhibition in London; and this and a duplicate have been hired by subscribing undertakings for local housing exhibitions.

The general educative campaign among the teaching and other professional classes has been steadily continued. The competition for school children this year exceeded all previous records in respect of the interest aroused. Over 1000 schools in all parts of the country took an active part in the competition, and at least 100,000 children were thereby directly interested in gas. The competition was arranged so as to secure the co-operation of the teachers, who are found to welcome this annual competition as an excellent means of adding interest and variety to the school routine.

It is proposed during the current year to invite the active co-operation of all gas undertakings in this campaign, so that they may work locally to create interest in the competition by offering prizes to children in schools in their districts, by arranging visits to works and showrooms, by lantern lectures given in the schools, and in other ways.

THE FOOD PRESERVATION CAMPAIGN.

The Association has continued to work in co-operation with the Food Production Department on the question of Food Preservation; and it is hoped this work will be carried on still more actively in the future, either in co-operation with or independently of the Government.

GAS AND TRACTION PURPOSES.

The final report of the Inter-Departmental Committee on the "Employment of Gas as a Source of Power, especially in Motor Vehicles in Substitution for Petrol and Petroleum Products," has been published. Its conclusions and recommendations are entirely favourable to the use of gas. The thanks of the Association are due to those who represented it on the Committee (the Chairman of the Executive and Alderman W. Kay) and to those who gave evidence on behalf of the Association—Messrs. W. M. Barrett (Manchester), J. G. Clark, F.C.S. (London), and R. Halkett (then at Glasgow). Mr. Clark also rendered valuable service as a member of the Expert Sub-Committee appointed after the publication of the Committee's Interim Report.

GAS FOR ELECTRICITY IN NATIONAL KITCHENS.

The steps taken by the Association to secure the correction of statements made in the "National Kitchens Handbook," published by the Ministry of Food, which were detrimental to gas and unjustifiably favourable to electricity for cooking purposes, resulted in the publication of an admission by the Ministry of Food that the statements were not borne out by their subsequent experience of the two systems of cooking.

FUEL RESEARCH BOARD.

The Association has been represented by the Chairman of the Executive at Conferences with the Board of Trade and Sir George Beilby on the report of the Fuel Research Board, at which objections by the industry to certain points in the report were strongly urged.

HOUSEHOLD FUEL AND LIGHTING ORDER.

Members of the Association have continued to co-operate in the carrying out of this Order, and in doing everything possible to mitigate the effects of its policy on the industry. It is hoped that before long the Order may be entirely revoked, so far as it restricts the use of gas.

SALES ORGANIZATION DEPARTMENT.

An important scheme for assisting members to organize sales development in their areas, and to give them continuous service in regard both to sales development and office organization generally, has been launched during the year, under the direction of Mr. F. H. Holland, and has already been adopted by a considerable number of undertakings. It is hoped that this new branch of the Association's activity will prove of much value to the industry.

DISTRICT CONFERENCES.

Successful and well-attended District Conferences—at which special attention was devoted to the Housing Problem, the facts relating to Fuel Conservation, and the new Sales Organization Scheme—were held during the summer at Blackpool, Bristol, Cardiff, Colwyn Bay, Derby, Edinburgh, Reading, and Sunderland. The Chairmen, Directors, Members of Committees, and Officers of the local undertakings did all in their power to facilitate the arrangements for these conferences and to secure the comfort of those attending them.

It is proposed to continue in the current year the policy of holding District Conferences. These conferences afford opportunities for the meeting together of the administrators and officers of undertakings for the discussion of matters relative to the commercial development of the industry, which are clearly welcomed by all concerned and of undoubted value to the undertakings represented.

VICE-PRESIDENTS.

There were added to the list of Vice-Presidents during the year:

Sir Arthur Duckham, K.C.B.,
Sir Percy K. Stothert, K.B.E.,
The Conveners of the Gas Committees at Aberdeen and Dundee,
The Chairmen of the Gas Committees at Blackpool, Burnley, and Nottingham,
The Chairmen of the Reading and Sunderland Gas Companies.

THE NATIONAL GAS COUNCIL.

The Association is represented on the Central Executive Board of the National Gas Council by Alderman F. S. Phillips, Sir Hallewell Rogers, M.P., Mr. D. Milne Watson, and the Chairman of the Executive Committee.

THE FEDERATION OF BRITISH INDUSTRIES.

The Association is now represented on the Grand Council of the Federation of British Industries by the Chairman of the Executive, who has been elected to the Council as one of the representatives of the Public Utility Group.

NEW OFFICES.

The Executive are co-operating with the National Gas Council and other organizations for the purpose of securing better office accommodation, of which the Association is in urgent need.

OBITUARY.

The Committee have to record with deep regret the death of Mr. T. H. Duxbury, an enthusiastic member of the General Committee from its formation.

THE ELECTION OF PRESIDENT FOR 1919-20.

The Committee have the pleasure to report that Sir Robert Hadfield, F.R.S., has consented to be nominated for election as President for the ensuing year.

MOULTON, President.
F. W. GOODENOUGH, Chairman of Executive.

Mr. GOODENOUGH said he had the honour, on behalf of the Committee, to present the report and accounts for the past year. Both, he thought, would speak for themselves; and there was very little that he need say in the limited time at disposal. One feature of the accounts which was regretable, but unavoidable, was the steady rise in the proportion of their revenue that had to go to administration expenditure. The Association's half-crown had not gone up as a consequence of the depreciation in the value of the sovereign. Their subscription remained at the same level; but the expenses naturally had been driven up in sympathy with the general rise in the cost of living and administration generally. The report gave an account of useful work done; and he was principally concerned now to say a word or two about the work that lay before them in the future. He regretted that he had not any prepared notes to speak from, as he had intended doing; but staying for three days in a dark room at the end of last week was not conducive to the compilation of a paper worthy to be submitted to the Association. The work in the future would first of all be to continue what had been done in the past—spreading knowledge among the public of the many uses and advantages of gas, and the correction of misapprehensions (and sometimes misrepresentations) with regard to the possibilities of gas and the relationship which it bore to its competitors. This work went on, both obviously in the press and also quietly in educational ways in other directions, of which members had recently received somewhat full particulars. But in addition to the publicity work that they had been doing, they had now started, as those present were aware, a plan for assisting gas undertakings throughout the country to improve the machinery of their sales development

department. This scheme was being taken up so widely as at present to be an embarrassment to those who had charge of this section of the Association's work; but it was hoped very soon to be able to improve the facilities at Mr. Holland's disposal, and to enable him to give the good service to the industry that he was prepared and anxious to give.

THE HUMAN MATERIAL IN THE SALES DEPARTMENT.

But there did seem to him (Mr. Goodenough) a very important piece of work to be done, above and beyond what they had already done or planned to do. They were planning now the machinery for sales development; but there was one thing they had not yet touched—which the industry itself had only spasmodically touched in certain quarters but by no means generally—and this was the training and the education of the human material which would compose the living part of the machine of which the Association provided the inanimate part. No schemes of sales development, no schemes of publicity, were of much value if they were not carried out and supported by a thoroughly trained up-to-date staff of officers and men engaged in the outdoor work of the gas undertakings; and they had not so far made any organized effort to train their sales staff in modern business methods and the science of salesmanship. There was a science of salesmanship, of which he hoped on another occasion to say something rather more extended; and he was very keen that they should at an early date take steps to improve their organization in this respect. First of all he thought they could do so by organizing comparatively small District Conferences of the members of staffs actually engaged in the work of dealing with the public. Then they could consider whether it would be possible to develop some thorough educational scheme, leading up to examination and certification, which would enable them to raise altogether the efficiency of these staffs. Unless they could support all the work they were doing by thoroughly organized good service to the community, a lot of their labour would be in vain. This was the principal idea that he wanted to put in the minds of the members that morning, though he had not (for reasons already explained) developed it as he would have liked to have done, and as he hoped to do before very long. He wished members to be thinking over the best way in which the Association could attack this very important problem of improving on the human side the organization of the commercial side of the industry. With these few remarks, he would move the adoption of the report and accounts.

THE INCREASING MEMBERSHIP.

Councillor STUART DOUGLAS ELLIOT (Edinburgh), in seconding the motion, said they had just heard about the future programme of the Association, and perhaps he ought to say something about what had been done during the past year. The accounts were very satisfactory, though again there was a small balance on the wrong side. He hoped next year this would be wiped-out, and that there would be a balance in hand. It was gratifying to see that so many as 62 additional companies or corporations had joined the Association; and he was glad to see that a considerable proportion were from Scotland. He flattered himself they were taking the advice he gave them last year; and he hoped next year there would be no companies or corporations who were not members. If there was one thing they had learned during the past few years, it was the value of propaganda; and a great deal of the work of the Association consisted of this. They were much indebted to the office-bearers and officers for all they had done.

THE TRAINING OF SALESMEN.

Mr. PERCY S. HOYTE (Plymouth) proposed a hearty vote of thanks to the Executive and staff for the work they had carried out for the Association during the past year. The increased cost of administration expenses was, he thought, the very last thing the members of the Association should grudge—especially with the staff they had working for them. As to the development of sales, they had adopted a scheme at Plymouth; and, no doubt in common with many others who had adopted it, there was the greatest difficulty in finding the right sort of man to set the scheme on its legs. He did not know whether Mr. Goodenough had a training college in mind; but he (Mr. Hoyte) was certain that the undertakings that adopted the scheme, unless they were so fortunate as to have a man on the spot who was a trained salesman, would be only too glad to avail themselves of a trained man. He would like to ask the Executive to consider the question of having a sort of training college for sending men out to the various undertakings to start the schemes and get them running properly. It was absolutely essential. One's ordinary staff, capable though they might be, were not trained salesmen.

Mr. H. M. THORNTON (London), in seconding, remarked that, as a member of the Executive for a good many years, though not now one, he could speak with very considerable knowledge of the splendid work this body had done. The Chairman particularly had been the mainstay of the work for many years, and had gradually brought them to the highly successful Association they were to-day.

The report and accounts were unanimously adopted.

The CHAIRMAN said that before putting the vote of thanks to the meeting, he just wanted to interpolate one remark. The Association began eight years ago with a membership of 253. Now the report told them they had got to 609; but they had some distance yet to go before they reached what was very desirable in the interests of every gas-works, in the interests of the Association, and in the interests of the country—that was to secure 100 p.ct. of the gas undertakings. He hoped it would not be long before this point was reached.

The vote of thanks to the Executive and staft was cordially passed.

Mr. GOODENOUGH, when returning thanks, said that during Mr. Mason's absence they had been very fortunate in having a good second in command in the person of Mr. Walker, the Assistant Secretary. As to the accounts, his only regret was that the income had not risen in proportion to the rise in the cost of administration, so that the percentage might have been no greater than in pre-war days. The depreciation in the value of the sovereign had hit them very hard in their work, because money spent on publicity went so much less far nowadays than it used to do; and with more to spend on administration they had less to spend on what cost them more. This was the point he had in his mind. The question of a training college for salesmen needed full discussion by the members. He did think that a skilled staff was going to be a great need of the industry in the future, if they were to reap anything like the harvest that was waiting for them when their whole organization got to work. They had had on the previous day figures from Sir Dugald Clerk with regard to the quantities of coal used in other ways than by carbonization, which to his own mind held out further promise of a very large increase in business for the gas industry, if the field was properly tilled by good machines and good men. Probably the direction in which it would be possible to work would be by men coming from the outside districts to the centre for training. That was a big subject, which he only wanted now to put into the minds of members, so that they might think it over.

THANKS TO THE PRESIDENT.

He would like to move that their very best thanks be given to Lord Moulton for his services as President in the past year. They had already had an opportunity of thanking him for his valuable address.

Mr. J. H. ELLIS (Plymouth), in seconding, declared that they could not thank Lord Moulton too much. Nobody would ever know one-half what he had done for the gas industry during these years of war; and the country would never know one-half what he had done for the community.

The vote was heartily carried.

THE HOUSING PROBLEM.

Two papers dealing with the "Housing Problem" were then read—the first, from the standpoint of the architect, by Mr. Edwin J. Sadgrove (President of the Society of Architects), and the second by Mr. H. H. Creasey, from the standpoint of the supplier and consumer of gas. They were followed by as much discussion as was practicable in the time remaining at disposal.

Opportunity will be taken later of giving some account of this portion of the proceedings.

Before dispersing, the members passed a hearty vote of thanks to Alderman Phillips for having occupied the chair.

COAL CONSERVATION AS AIDED BY THE GAS INDUSTRY.

By Sir DUGALD CLERK, K.B.E., D.Sc., F.R.S.

The conservation of our remaining stores of coal is of the utmost importance to the continued existence of the present population of the United Kingdom. The 46,000,000 people who live in comparative comfort in these islands could not have existed here except for the introduction of the era of coal, and the production of the whole of the modern mechanism of civilization by inventors and manufacturers flowing from the use of coal in different ways.

Before the advent of coal and its attendant inventions, we had but a small population; and we were an agricultural country, living mainly on the products of our own land. The beginning of the industrial revolution about the middle of the Eighteenth Century was followed by a stream of metallurgical inventions—by James Watt's work on the steam-engine, and Stephenson's application of steam to the locomotive. Gas was produced from coal at an early date, and came into practically universal use during the Nineteenth Century. Gas also began its practical progress in the original home of the Watt steam-engine—Soho Works, Birmingham. The world is indebted to Murdoch for his perseverance and ingenuity as an early experimenter in gas lighting. Our continued prosperity, therefore, depends upon the existence and the proper use of our coal.

Coal conservation involves the study of great problems, and requires the examination of coal in all its stages of production and use. The losses incurred in mining, in distribution, and in use for manufacturing, for transport, for metallurgical chemical reductions, for heating, for lighting, and for motive power, all must be thoroughly studied and understood. Metallurgical engineers, motive power engineers, and the engineers of the gas industry have devoted close attention to these matters for more than a hundred years; and the results of their work and inventions are found in all the conveniences of our modern civilization. Furnaces, for example, require close study in order to trace the heat losses from various causes and reduce them. If the furnace

be intended for the reduction of metal from an ore, such as a blast-furnace, then chemical problems require study as well—such as the nature of the reactions causing the reduction from the ore by combination with the oxygen and other bodies existing in a combined state in the metal. The laws of thermodynamics are required in order to study the chemical economical production of motive power from heat-engines, be they gas, oil, or steam. The laws of the generation and distribution of electricity are also involved when either light, or motive power, or even heat is to be produced by electric means. Thousands of industrious inventors and scientific men have been long engaged on these problems; and the whole world of scientific knowledge is required to contribute to their success.

Although all engineers have long understood the importance of studying this subject of coal conservation, it is only comparatively recently that coal problems have been brought in a simple way before the public. The first really popular work on this subject was Jevons' famous book of fifty years ago on the coal question. Since that time the Government and the general public have acquired an interest in the question. Recent circumstances, such as the great war and the railroad strikes, have compelled their attention. The great war showed clearly the helplessness of those nations who had only a defective supply of coal; and the transport strikes in our own country brought home to all of us the extent on which we relied upon coal for our comfort and our continued existence. It became very evident that the growth and maintenance of the United Kingdom and the British Empire depended upon an abundant supply of coal. The recent interest in coal problems thus concerns a vital matter; and men so widely separate as the Prime Minister, Lord Fisher, and Mr. Smillie have all expressed their views on the subject. There is some danger, however, in this popular treatment; and many false notions have obtained currency and raised exaggerated hopes.

A Popular Fallacy.

A popular writer, Mr. Sydney Brooks, has recently stated: "We are all sinners in this wastage of coal—householders, collieries, manufacturers, gas-works (they, perhaps, are the greatest of all), railways, every person, every firm, every industry that uses it at all." In this statement Mr. Brooks is evidently in ignorance of the high efficiency of the operations of the gas industry. Like Lord Fisher, Mr. Brooks has taken a roughly popular view of the solution of one part of the coal conservation problem; and both advocate electricity as a means of producing economy for lighting, for heating, and for power. Mr. Brooks says: "Undoubtedly the largest and most fascinating of all these questions is that raised by the Coal Conservation Committee, in that it suggests that the true function of coal is to be transformed into electricity—in other words, to form the raw material for lighting, heat, and power, which can then be transmitted almost as cheaply and universally as water." In view of widely spread statements of this kind, it is desirable to examine broadly into the efficiency, both relative and absolute, of the principal operations in the gas and electrical industries.

Just before the war, we raised about 290 million tons of coal per annum. Of this quantity, 90 million tons was exported, and nearly 200 million tons consumed at home. The gas industry is responsible for dealing with, but not consuming, about 20 million tons of coal per annum, having an average estimated calorific value of 13,000 B.Th.U. per pound. The electricity generating industry of the country consumes about 6½ million tons per annum, if calculated at the same thermal value. In the case of electricity, this coal is entirely consumed; and the only product is electric energy. In the case of the 20 million tons carbonized by the gas industry, there are three main products—coal gas, coke, and tar—and a multitude of bye-products, including light inflammable oil for motor cars, sulphate of ammonia for fertilizing, and many other substances. There is consumed throughout the country for domestic purposes in households nearly 40 million tons of coal per annum; so that domestic use, the gas industry, and electrical generation use in all over 66 million tons of coal yearly. Estimates have been prepared of the coal consumption involved in producing steam and other motive power; and it is stated to amount to about 80 million tons per annum. The remaining part of the coal used at home is consumed for metallurgical purposes and various uses in manufacture.

Water Power in the United Kingdom.

In order to allow for the increase in the output of our industries, together with the domestic increase due to expanding population, it is vital to economize to the utmost. One way open is, of course, to deal with the heat losses involved in the different operations which have been mentioned. But another way is to reduce the amount of coal required for motive power by utilizing our water power resources in the Scottish Highlands, in Wales, and in Ireland. A Board of Trade Committee have been at work for over a year in determining the availability and the amount of the water power which can be obtained from our own country. The result of their investigations appears to show that engineers had somewhat underrated the possible water power of the United Kingdom, and that, instead of the total being only one million horse power, it appears to be about a million and a half. This power of a million and a half horse would be available for twenty-four hours per day all the year round. It is important to consider the saving in fuel which could be made by the use of this power. The total power of the steam and other engines of the United Kingdom, as shown by the Census of Production of 1907, was then about 10 million horse. The number of hours per day during which this 10 million H.P. was generated is not known; but it could not be more than twelve hours per day all the year round. It thus follows that 1½ million horse of water power continuously used is equivalent to 3 million H.P. for twelve hours per day, which I assume to be a probable value of the Census results. From this it follows that the 1½ million H.P. water really gives three million H.P. on the steam scale. We shall not be far out if we take the continuous possible water power as equal to one-third of the total motive power of the kingdom. If this water-produced motive power could be substituted for the steam and other engines, obviously we should save one-third of the estimated coal consumption of 80 million tons—that is, over 26 million tons of coal per annum. It is unlikely, however, that the use of water power will ever reduce the number and power of heat engines; but it would enable us to increase our available power without calling further upon coal—that is, the use of water would enable the total motive power of Great Britain to be increased from 10 to 13 million H.P. without any increased fuel consumption. The Government, through the Board of Trade Committee, intend to save large quantities of coal in this way.

The process of carbonizing coal in gas-works is economical; and investigation has shown that the average thermal efficiency throughout the country at present is, approximately, 71 p.ct.—that is, after the completion of this process, the three main products produced at the gas-works (coal gas, coke, and tar) are capable of evolving, on complete combustion, 71 p.ct. of the original total heat of the coal. Of this, 25 p.ct. is obtainable from coal gas and 46 p.ct. from the coke and tar. Although the average of the kingdom is 71 p.ct., there are many works giving a much higher efficiency of production. The thermal efficiency of carbonizing gas coal in horizontal retorts has been shown in one gas-works to be 82·7 p.ct. In continuous vertical retorts a similar efficiency is produced. A material saving in fuel would therefore be made if the average efficiency were raised to 82 p.ct. from 71 p.ct. Apart, however, from the increase in over-all efficiency of the gas manufacturing process, one result of war conditions has proved that distributed gas is so much more useful than even solid coke that it is better to increase the gas yield at the gas-works by producing water gas from coke (either by steaming or in a separate apparatus), and mixing the water gas with the distilled product from the retort. By so doing a larger percentage of the total yield of the process is given in the form of gas. It has been proved possible to obtain 50 p.ct. of the whole heat of the coal in the gas delivered by this means—that is, 50 p.ct. of the heat of the coal would then be sold as gas, and a corresponding reduction made on the coke produced, but not upon the tar. Indeed, it is shown that the steaming process increases the tar product, instead of diminishing it. The gas so produced is, of course, of a lower calorific value than ordinary coal gas without admixture; but it is quite sufficiently high to give a flame temperature suitable for incandescent lighting, gas-furnaces, and gas engines. The heating value of this mixed gas is somewhere about 420 B.Th.U. per cubic foot.

The Claims of Gas and Electricity.

I have long been of opinion that such a reduction in the heating power of gas would enable us to sell to the public a much larger number of heat units per unit cost than could be distributed from coal gas with high calorific value and illuminating power. I have already discussed this question in a lecture delivered before the North of England Gas Managers' Association on April 29, 1905. As it has been asserted by Mr. Ferranti and some others that the energy of coal could be best distributed by the production of electric current from it, and, inferentially, that this is better than the present method of obtaining heat from coal gas, I shall first discuss the relative efficiencies of coal gas and electricity as means of distributing heat. But it is well to quote Mr. Ferranti's statement, given in his Presidential Address to the Institution of Electrical Engineers in 1910:

> It appears that with a problem such as we are discussing, it is fundamental that the energy in the coal should be converted at as few centres as possible into a form in which it is most generally applicable to all purposes without exception, and in which it is most easily applied to all our wants, and is, at the same time, in a form in which it is most difficult to waste or use improperly.
>
> We are, therefore, forced to the conclusion that the only complete and final solution of the question is to be obtained by the conversion of the whole of the coal which we use for heat and power into electricity, and the recovery of its bye-products at a comparatively small number of great electricity producing stations. All our wants in the way of light, power, heat, and chemical action would then be met by a supply of electricity distributed all over the country.

This statement of Mr. Ferranti in 1910 may no doubt be regarded as the basis of the super-station proposals of Parliamentary Papers Cd. 8880 and Cd. 9084.

It will now be shown that any claim to superiority over gas in coal economy—that is, the conservation of our coal supplies—is not justified by facts. With a gas containing 25 p.ct. of the heat of the original coal and a total carbonization of 20 million tons, the heat of 5 million tons of coal is available from the gas produced. The total heat, however, used in the gas-making process, if debited entirely to gas and no portion of it to the production of

tar and coke, requires the addition of 5·8 million tons to the 5 million—that is, the gas may be regarded as the product of 10·8 million tons of coal; leaving heat equivalent to 9·2 million tons of the original coal remaining in the coke and tar. The point is that we obtain the heat equivalent to the complete combustion of 5 million tons of coal stored in the gas with the utilization of 10·8 million tons.

Now to compare with electricity. The electrical generating stations of the country which are supplied by coal, according to Mr. D. Wilson, the Technical Adviser of the Coal Controller, in the year ended March 31, 1918, generated 4674 million of electrical units on a coal consumption of 3·47 lbs. per unit; the calorific value of the coal being 11,600 B.Th.U. per pound. The thermal efficiency of generation was 8·5 p.ct., and the total consumption of coal in the year 7·3 million tons. This coal is of lower thermal value than gas coal, in the proportion of 11·6 to 13. Correcting for this, the electricity industry is consuming the equivalent of 6·5 million tons of coal at 13,000 B.Th.U. per pound. Allowing for this efficiency of transformation, the heat produced from 6½ million tons of coal by electric resistances at the consumers' end is only that due to the consumption of 0·55 million ton of coal. From this it appears that, in its capacity for heat production, the gas industry is nine times that of the electrical industry. To supply the same amount of heat as the gas industry would do on burning its whole gas product, the electricity generating undertakings of the country would require to consume 58½ million tons of coal of the same thermal value as that used by gas. As gas requires a consumption of only 10·8 million tons, its thermal efficiency as a heat agent is 5·36 times that of electricity. Assuming the same efficiency of transmission for gas and electricity (approximately 90 p.ct.), the proportion of the efficiencies does not change.

So far the discussion deals only with the relative quantities of heat energy which can be supplied to the consumer by the two systems. When the consumer receives his gas, he produces heat by its combustion; and the efficiency of use varies with the nature and the relative perfection of the apparatus employed for heating rooms, for heating and boiling water, for cooking ovens, and other apparatus in domestic use, or for metal-melting furnaces or welding, or metal heating and tempering as used in factories. If the efficiency of the electric apparatus required to produce heat in home and factory were the same as those of gas, then the thermal efficiency ratio would remain constant. This, however, is not the case. Thermal efficiencies of use vary considerably. An examination has been made of the efficiencies of gas-fires as contrasted with electric radiators or heaters for rooms, for water heating, cooking oven, and metal melting.

In heating rooms by gas, to apply 27 heat units to the raising of the room temperature by radiation and convection requires the use of 100 heat units at the gas-works; while heating by electricity, for 7·6 heat units so applied, 100 heat units are used at the electricity generating station.

Heating and boiling water by gas, applying 22·5 heat units to the work, requires the use of 100 units at the gas-works; while electricity applies only 3·8 units to the work for 100 at the station.

For cooking by oven, gas applying 3·4 heat units uses 100 units at the gas-works; but electricity utilizes only 1·6 heat units for 100 used at the station.

According to Sir Robert Hadfield's data for steel heating to 900° C., utilizing 14·4 heat units, gas requires 100 at the gas-works, and electricity utilizes 4·1 heat units for 100 at the generating station.

In all these cases a much greater heat quantity must be used at the electricity generating station than at the gas-works to apply the same quantity of heat required for domestic and manufacturing purposes—varying from two to six times. In a general heat supply by both systems, the average value will depend on the proportion of the different types of uses included in each system. With the proportions estimated as existing in the gas heating services of the country, the probable value of the ratio of thermal efficiencies from users' apparatus to gas-works or electricity generating station is about four—that is, electric heat supply, if substituted for gas heat supply, would necessitate the consumption of four times the fuel or thermal value. In this case, instead of consuming 10·8 million tons of coal annually, if the whole gas or current be converted into heat, 43·6 million tons would be required.

From this it is obvious that, in so far as electricity is substituted for the ordinary operations of heating by gas, coal consumption would be seriously increased. With regard to heat supply, obviously gas is much more economical of heat than any electical generating system. With regard to motive power, gas also gives higher thermal efficiencies. At about 75 p.ct. of full load a gas-engine of the ordinary type will deliver to the consumer as actual or brake horse power 11 p.ct. of the heat used at the gas-works to produce the necessary gas for distribution to the consumer; while an electric motor will deliver, also as brake horse power, only 6·8 p.ct. of the heat used at the electricity generating station. The efficiency of the gas power production and distribution is thus over 1·6 times that of the electricity system.

The results which have been here given refer to the estimated average performances of the whole of the gas-works and electricity generating undertakings of the country as in operation at present. But, as would be expected, there is some variation in the values given by the different gas-works and central stations. The average thermal efficiency of carbonization has been arrived at by the examination of a year's working of large gas undertakings, such as the Gas Light and Coke Company, the South Metropolitan Company, and other London and Provincial Companies. The efficiency values for the generation of electricity have been taken from the statements of Mr. David Wilson, the Technical Adviser to the Coal Controller. Both systems show that in individual cases much higher efficiencies are at present obtained than the average figures.

THE LIGHTING POSITION.

With lighting, the position is somewhat different—the two systems are in keener competition. The efficiency of the apparatus of light production varies considerably. But to compare the best known of both, it is desirable to consider first the inverted incandescent mantle at ordinary gas pressure, and the so-called one-watt electric lamp. The inverted incandescent lamp requires the use of 47 B.Th.U. at the gas-works for each candle-power-hour obtained by the consumer. The one-watt electric lamp requires the use at the generating station of 54 B.Th.U.; the half-watt lamp requires only 31 B.Th.U. Accordingly, if all lamps used electrically were of the former type, electricity would require a greater heat consumption than gas; but if all were of the latter type, then electricity would be more economical than gas.

Again, all the incandescent burners used are not of the inverted type; a considerable proportion consists of the upright type, which is much less efficient, requiring 82 B.Th.U. per candle-hour. If we assume the gas-lighting system to consist of equal numbers of vertical and inverted burners, then 64 B.Th.U. would be required per candle-hour. High-pressure incandescent burners reduce the heat consumption to 23 B.Th.U. per candle-hour, and flame arcs in electric lighting come even below this economical figure, using only 13 B.Th.U.

Statistics as to the number of lamps and the nature of the various types in use in both systems are much required, in order to determine the most economical combination from the thermal point of view. In the case of both gas and electricity, improved results are to be expected in the future; but no improvement in electricity can ever make it economical as a means of producing heat. Gas motive power, too, will always give higher efficiency than that obtainable by electrical generation under present circumstances. Super-stations have been proposed with even higher efficiencies.

The general conclusions on the comparison between gas and electricity are to be found at the beginning of a report on the Coal Gas and Electrical Supply Industries of the United Kingdom by Professor Cobb, Professor Smithells, and myself. The six summarized statements are:

1.—If the whole of the heat expended on the carbonization of coal be debited to the coal gas which is produced, then, of every 100 units of heat so expended at the gas-works, 45 are conveyed to the consumer in the supply of gas.

2.—At the present electricity stations of the United Kingdom, of every 100 heat-units expended by the combustion of coal for the generation of electricity, 7·6 are available for the consumer.

3.—In the best existing undertakings for gas and electricity the figures are altered as follows: For gas, 52; and for electricity, 12.

4.—In the proposed super-station the conjectural figure for electricity is approximately 18. With improved practice of coal carbonization the corresponding conjectural figure for gas is about 75.

5.—For heating purposes, except where temperatures above 1700° C. are required, gas is vastly more economical of fuel.

6.—For lighting and power production, a comparison of the thermal efficiency of fuel consumption in the case of gas and electricity does not give a dominating claim to either.

The 40 million tons of coal consumed for domestic purposes could be largely reduced by the introduction of gas-fires instead of coal-fires. In coal-fires as ordinarily used, heating the room mainly by radiant heat, it appears certain that not more than 8 p.ct. of the heat of combustion of the coal is utilized in the room. Heating by gas-stove is very much more efficient—27 to 31½ p.ct. of the total heat of the coal used at the gas-works reappears in the room as available radiant and convected heat. If all the coal consumed were used for heating in this way, the substitution by gas would reduce the consumption to 13⅓ million tons, instead of 40 millions. It cannot be assumed, however, that all the heating by coal is so inefficient; but it is very probable that, taking all coal uses, gas used for domestic purposes would reduce the consumption of solid coal by one-half—that is to say, instead of using 40 million tons, we could reduce it to 20 millions.

Apart from economies in generation and distribution, there is still a large margin for improvement in the construction and design of gas-consuming appliances for the production of heat, light, and motive power—so considerable that it is certain that even better thermal results will be practicable in the early future. The intensity of effort in the production of new devices will be greatest in the field of illumination, both with gas and electrical devices. Even in gas-engine efficiencies great improvements are probable. The movement as to larger gas-engine units is proceeding, though at a somewhat slower rate than other gas improvements.

The extension of the industrial stage of our civilization can only be made possible by the co-operation of the Government of the country with the gas, steam, electric, and hydraulic engineers, in order to ensure the full utilization of all our sources of heat, light, and motive power for the good of the community, even at the cost of some legislative interference with the immediate profits

of some industries. The sources of energy on which we depend for our existence should be conserved with the greatest care.

The British Commercial Gas Association has an important and definite place in the general mechanism of coal conservation. Its place resembles that of the man of business among the workmen of the industries, and the scientific and technical men who invent engines and mechanisms for supplying the nation's needs. Without the man of business all the work of the artizans, inventors, and scientific men would remain without unity of direction, and could not be made useful to the public. This important Association performs the function of informing the public as to the beneficial uses to which the products of all the gas industries of the kingdom can be applied. The man of business performs the necessary function of bringing about plentiful production and distribution of the necessities and comforts of life. His function does not seem to be fully realized by scientific and literary men; while some workmen are so blinded as to think of him as an enemy instead of the useful friend which he really is. The gas industry, aided by business men in the shape of our Society, at present takes a large share in saving the coal of the country; and in the future, judging by all present indications, this share will be greatly increased. We need not fear in any way the legitimate competition of electricity and other forms of energy distribution.

Sir ARTHUR DUCKHAM, in proposing a hearty vote of thanks to Sir Dugald Clerk, said he was sure they all appreciated the tremendous assistance he had given to the gas industry. In Sir Dugald Clerk, they had a man whose knowledge was profound, and whose word was never doubted, or, if doubted, it was always made-good. The figures which he had put forward in the paper made the case out for the economy of gas for heating without any question whatever. He himself would like to make a few remarks upon the paper, and upon the subject of fuel economy. Mention had been made of the loss of fuel in coal mines. There was the loss of fuel not only underground, but above ground. That was a question he could talk to them about for a very long time, and show how great the losses were at the source of the fuel supply. This question, however, was not mainly relevant to gas. They could not help these losses, except as members of the general public, and by trying to persuade the Government to take proper steps to control the coal industry of this country. The low price of fuel in the past had undoubtedly been responsible to a very large degree for the wasteful use of fuel. In many cases it had not been worth while to go into the capital cost in order to save fuel, because fuel was such a low price, especially in many of our large industries which were carried on round the pit's mouth. At the present time, however, we had high cost of fuel, and immediately there came a cry for fuel economy. This was a subject in which they were all keenly interested, and it was a subject in which they could help. The commercial superiority of this great country in the past had been dependent on its cheap fuel; in future, our commercial superiority must rest on the economical use of our fuel. We had not studied economy in the past as we should have done. He did not think it was too much to say that, with coal at twice the pre-war figure, provided economy be used to the best advantage in every industry, we should not have much greater fuel costs than we had pre-war. He believed the saving to be made was as great as that. During his work for the Government, he felt very strong—and he had spoken strongly—on the question of the Government's interest in the subject of fuel economy. Lord Moulton had mentioned the Government effort on behalf of electrical generation in this country. To him, this step of the Government seemed to be an entirely wrong one. Electricity was not the only subject that governed the industries of this country from the power or heat point of view. This was a subject which should have been tackled as one subject. We should not have had electrical commissioners. We should have had commissioners for heat, light, and power, tackling electricity generation, and gas-works, tackling coke-oven generation, and tackling waste heat from blast furnaces and going into the question of water power which Sir Dugald Clerk had mentioned. There ought to have been one body which would have brought them all together on this great subject—a body not of control, but of help; a body to bring their thoughts together for the best use of the nation. Instead of this, we had launched out into one direction—electrical commissioners. But he thought it was a thing which was of the greatest interest to the country that the line should be broadened into the three directions that he had mentioned—viz., heat, light, and power, leaving out gas or electricity, or any other specialized name. Sir Dugald Clerk had dealt with the translation of heating values of coal into the actual agency we used—such as gas or electricity. He had said that if we used electricity as a heating agent, we only get about 8 p.ct. of the actual heating value of the coal to use for the house; the other 92 p.ct. was lost. Surely they ought right away to say that this was a method which was too uneconomical for consideration, and it was difficult to consider it only on the heat unit, because in the proper treatment of the coal so many products were obtainable. Therefore the heat units were more valuable in their new form than they were in their original form as coal. Sir Dugald Clerk had made out a case showing very clearly the great advantages which accrued from the treatment of the coal before consumption. But it was difficult to put any real value, or to show any balance-sheet, by which they could prove the economies that were effected by obtaining tar oils, benzols, and other materials which were useful in the heat market in a much better way than in the original form of coal. Undoubtedly there should be no false competition between gas and electricity. They ought to run together. It should be a national movement together for the whole efficiency of the country, and undoubtedly they could run together. Gas engineers could help the electrical engineers, and electrical engineers could help them. The sooner this competition ceased, and there was combination between the two for the benefit of the country, the better it would be. In the case of the gas industry, they should be very happy people in the near future. He felt that a new era must come for the industry as a result of the Beilby report. This report (which was largely due to the work of Lord Moulton) had shown that gas of a lower calorific standard, and a much lower illuminating power, was the best gas to supply to the consumer. This opened-up much to the industry, because it allowed the gas to be manufactured at the most economical level; and it allowed the distributor to distribute at the most economical level to the consumer the same gas in the best way possible. He thought they had to contemplate a manufacturing plant which was elastic—a plant which would make a gas of, say, 400 B.Th.U. and also a gas of 500 B.Th.U., taking these as the limits. He thought they had got to face this. They were not yet settled down as to what was the best to use; and it might be some time before they were settled down and said they wanted a gas of a certain calorific value, so much tar and so much coke. It would be some time before that came. He thought, however, they had to look forward to a manufacturing plant which would give this elasticity, from the one end, the carbon in the coal, to the other end, making the best straight gas. But above all, from the gas point of view, from the economy that the gas would give, they must have a gas which was of even calorific value, of even specific gravity, and which was distributed by even pressure. Until they got these desiderata, he was certain they would never get the absolute satisfaction of the consumer; they would never be able to show the consumer the true efficiency of using gas as a fuel. Now was the time when the industry was willing and ready to absorb new ideas. The manufacturers were only too anxious to abandon the use of coal. If they went around works, they saw that they were surrounded and covered with small coal heaps or bunkers and clinkers, and the whole of the works were in a mess. He was certain that with a good gas most of the industrial uses of coal would go, and especially in such works as chemical works and kindred works of that sort. By the many different forms of coal treatment which were developed during the war, gas could be pushed and got into these works, provided they acted together and got out a proper scheme and showed the economy of working. He had done that personally in several works lately. Friends of his had asked for advice; and in a very crude way he had been able to show great economies which were to be made by utilizing gas for industrial purposes. At the present moment they were in the infancy of design. The most modern furnaces to-day were (to his mind) far from being perfect, and gas—even town gas—was more economical to use than the direct-fired furnace in a works. Another point which they sometimes considered was that they would not be able to touch the electrical furnace at high temperature for definite work; but he had recently seen results obtained in America with surface combustion and proper admixture of gas and air, which showed that the most economical way of obtaining these high temperatures was by surface combustion with proper refractory materials in the furnaces. Lastly, he came to the question of the domestic use. He spoke some time ago on this subject, and was afraid he got into considerable trouble over it. Gas was ideal for domestic use; for heating and for cooking. The question of lighting was a matter of dispute at the present moment; but how did they tackle domestic use? They sent out pamphlets, and they talked to the people. In some happy districts the appliances were looked after closely, and the best satisfaction given. But first of all they must start, for domestic use, with a gas of even calorific value, of even specific gravity, and of even pressure. Given this, there was no servant in the house comparable to gas. Further, in domestic use, they wanted to cut-down waste. When they took a boiler off a burner, the burner should go out. They ought to have some easy arrangement to turn gas-fires on and off, because a gas-fire heating by radiant heat made its effect so much more quickly felt that they could afford to shut it off on going in and out of a room. But what man would trouble to shut it off if he had to turn off the tap? Perhaps he ought not to say man. In most cases it was usually a woman, being the domestic servant. But there was a great point which he was quite certain they could tackle with great advantage. They could save the dirt of this great city, save all the traffic through the streets, and congestion on the railways, if this question of gas heating and gas cooking was properly handled. They had been brought up in the home of economy of fuel. It had been their life teaching. They had been brought up in it; they knew it; and they had to make their living by it. They were the only class of people who had really been brought up in that way; and the ball was at their feet. They had to kick it hard and far; they had to follow it up the first time, and they would get to their goal.

Prof. J. W. COBB said he was very pleased indeed to have the opportunity of following Sir Arthur Duckham in paying a tribute to what Sir Dugald Clerk had been long occupied in doing for the gas industry; and he was particularly glad that Sir Arthur Duckham in doing so put forward publicly what he (the speaker) knew he had put forward privately before as his idea—that the Government, in approaching this subject of fuel economy, ought to do it upon the broad basis of light, heat, and power, and not

upon the rather narrower basis which unfortunately had been characteristic of the efforts they had made so far. But apart from any inquiry by the Government or action of the Government, there was never a time when the efforts of the gas industry itself towards a complete examination of their own problems could be so usefully directed. They should determine for themselves exactly where they stood; and, not only that, but the public at large should know where they stood. They had nothing whatever to fear as the result of any such inquiry. Most people alive at the present time had been brought up accustomed to the use of gas. They had come to take its many advantages and excellences for granted. It had been, as Lord Moulton had said, quietly useful throughout. But the time had come when it was necessary to show that these advantages were very real. The quietly useful service of gas hitherto might well be described as a silent service; but this period was in one sense vanishing, owing to the efforts of the Association. Apart from the methods which it was necessary and desirable to adopt in order to educate the general public in the usefulness of gas and its advantages, it was also advisable that the position of the industry from the scientific standpoint—from the standpoint of coal conservation—should be clearly made out, for the benefit of all those who would concern themselves with it, by scientific and technical investigation; and this was the task with which Sir Dugald Clerk had so closely identified himself. Some of the results of this application had been put before them that morning, with the passionate devotion to accuracy and detail that was characteristic of the author. The questions that were put forward had never been answered, the arguments which Sir Dugald Clerk brought forward had never been refuted—and that for the best of all reasons. He (Prof. Cobb) spoke with first-hand knowledge of this matter in referring to Sir Dugald Clerk's share in it, because it so happened that he had been quite closely associated with him in this work throughout. He had therefore had the chance of admiring, and now was glad to have the opportunity of bearing witness, not only to the ability and knowledge which Sir Dugald Clerk had brought to bear throughout upon the subject (because this, he thought, they would all of them have taken for granted from the beginning), but to the wonderful energy he had displayed in the matter at a time when, from achievement in the past and seniority, he might well have thought that he was entitled to be content with the laurels which he had already obtained. Therefore he was very glad to second the vote of thanks.

The PRESIDENT said that if no one had any question to ask, he would put to the meeting the vote of thanks which had been so brilliantly moved and seconded by people who were great authorities on questions relating to the conservation of fuel and to the gas industry. He desired to associate himself most earnestly with all the remarks that had fallen from Sir Arthur Duckham and Prof. Cobb.

The vote was cordially agreed to, and briefly acknowledged by Sir DUGALD CLERK.

LUNCHEON AT THE SAVOY HOTEL.

Some Important Speeches.

After the conclusion of the business proceedings of the Association on Wednesday, there was a fitting conclusion in the form of a luncheon at the Savoy Hotel. Upwards of 170 representatives of the undertakings in the membership and guests were present. The intention of the function was to meet the President-Elect (Sir Robert A. Hadfield, Bart., F.R.S., D.Sc.), the Vice-Presidents, and the General Committee; but unfortunately Sir Robert was unable to be there, having been called abroad. The President (Lord Moulton) received the members and guests, and afterwards presided at the luncheon. At his table were: To his right-hand side—Mr. Garnham Roper, C.B., Mr. D. Milne Watson, Sir Arthur Duckham, K.C.B., Sir Harry E. Haward, Mr. E. F. Vesey Knox, K.C., Sir A. Churchman, Prof. Simpson, Sir W. Joynson Hicks, Bart., M.P., Mr. H. J. Waterlow, Mr. Lawrence Weaver, and Mr. E. J. Sadgrove. To his left-hand side—Sir George Beilby, Sir Dugald Clerk, K.B.E., F.R.S., Mr. H. E. Jones, Past-President Inst.C.E., Sir Hallewell Rogers, M.P., J.P., Mrs. M. A. Cloudesley Brereton, Sir J. Tudor Walters, M.P., Sir Daniel F. Goddard, Sir Alfred Robbins, Mr. J. H. Balfour Browne, K.C., Dr. Leonard Hill, Sir George Davies, J.P., and Mr. F. W. Goodenough, the Chairman of the Executive Committee.

After luncheon, the toast of "The King" was honoured.

FAITH IN FUTURE PROSPERITY.

Lord MOULTON said the next toast was one which would certainly be welcomed by those present. It was prosperity to the gas industry. That they were all attached to the industry, that they had a personal knowledge of its working, that they realized its difficulties, that they realized the disadvantages under which recent events had placed it, he was quite sure; so that this toast was a most important one. Were things to continue on the lines on which they stood at present, it would be, with these lines unchanged, a question as to whether the gas industry could carry on its services to the public, on the terms which by law it would be obliged to do. Fortunately, they had great faith in the justice of their fellow-countrymen; and they believed these clouds were but temporary, and that the industry would, so far as legislation could do it, be restored to a position similar to that which it occupied before the war, and which was in contemplation at the time previous legislation was passed. The gas industry had gone through heavy clouds. There was no more striking example of the impossibility of seeing, or providing for, the future than occurred in connection with the gas industry. It had a device, based on justice and well-thought-out, of making dividends depend on an arrangement like the sliding-scale. It was assumed that the price at which gas was sold was fairly met by the standard price. If the price of gas could be reduced, it was due to efficiency; if the price mounted up, it was due to inefficiency—a good broad generalization which reflected well on the judgment of the people who adopted it, provided always the general industrial conditions remained the same. A period of national trial had been passed through; and they had come now into a period of national trial in industry. They found that wages were two or three times as high as before, and that the cost of the materials on which the industry relied for producing gas had mounted far beyond anything expected at the time the sliding-scale laws were passed. One realized that the question of the raising of the price of gas no longer indicated efficiency or inefficiency. In the first place, it indicated a great change in the industrial conditions outside and independent of the gas industry; and until this had been remedied, they had no right to take the cost of gas as indicative of inefficiency. Therefore, to make the return upon capital now depend blindly upon the price at which gas was supplied was a gross injustice; and so the system had in the present failed of its object. Nothing would in his mind, either in the present or permanently, satisfy the industry, or enable it to do its work for the public well and under fair conditions, until a radical change in the position was frankly admitted and incorporated in legislation. He had no doubt this would be done. He had no fear of the British Parliament, representing British opinion, forcing the industry to do what they had no right in conscience to require. Therefore, he should pass from that, and assume that once more they were in the position of performing great services to the nation, and of carrying on its shoulders great national obligations, under fair terms. Now how were they to get prosperity in these circumstances? The first thing was that they had to work themselves. Whether they were doing all they could to fit themselves as fully as possible for the performance of these national services, they knew best; but no great industry like the gas industy had any right to remain behind the foremost rank of knowledge of its time. It was bound as a duty to itself and to the nation to keep itself abreast of the growth of science, and, as was reasonably possible, to bring into action all those advances which science told them from time to time were applicable to the work it did. They knew that there was tremendous inertia in all industrial work involving capital; and the gas industry was remarkable in the vast amount of fixed capital it necessarily employed. Capital did not like to change its work. Those who had studied the industrial problems of to-day felt that the world changed its needs so quickly that masters and men ought to be alive to the changes in advance, so as to change the form and nature and quantity of supply as best to meet it. Although the gas industry was tethered to its work, there was no switching-off the industry into producing new things. This principle held more strongly in the case of the gas industry than in any industry he knew. Just see how the industry commenced. It was providing light for the whole community. The time came when it had a rival which produced light, and formidably threatened the monopoly of light. Still more peculiar it was that the industry found in its own bosom someone who said: "You have got to produce heat; your illuminating gas—a costly form of light—we do not want." They then found themselves face to face with a demand to produce not a brilliantly burning gas, but a gas of as great thermal efficiency as could be obtained. It was the business of the industry then to switch-off, and to set to work to satisfy the new form of demand. Unfortunately, the laws that bound the industry gave it artificially the inertia of which he had spoken. It was impossible for its men to devote their energies to that which best met the then wants of the world, because they were tied up to that which best satisfied past wants. Fortunately they all very rapidly realized the position; but even at the present moment, they were fettered by the difficulty of changing the gas. He admitted this was largely produced by legislation; and the men of the industry were not, through it, free to devote their energies to producing that which the world most wanted. So that one of the ways in which they had to attain prosperity was to persuade their masters to leave them free to do that which the community most desired them to do. There were other sources of prosperity. The industry produced not only gas, but many other most valuable substances. Under the pressure of need, these substances, and the conditions of their production, had been widely studied during the troublous years through which they had passed. Much more was known about them than was known before. The value of coke, the value of the other residuals, the enormous importance of many of these things, had come out more clearly; and more accurate knowledge was now at command regarding them. They were now better able to say what was the best way of producing them—how purity and value, and suitability to the needs of the community, could be improved. He wanted them to realize that when he drank to the prosperity of the gas industry, he did so with a perfect hope that prosperity was coming, because from his intercourse with the organizations of the industry during the last two years, and during the years of war in which he had had the assistance of the industry so much, he was satisfied that, both in the older members and in the younger members, there was a desire to keep abreast of knowledge, and to work in the way that, to the most enlightened and most learned in the matters with which they dealt, would give the satisfactory feeling that their country was holding its place in the front rank of nations. [Cheers.] With this hope, and with this meaning, he proposed "Prosperity to the Gas Industry." He was going to be seconded by one who had heard his speech; and he (Lord Moulton) wondered whether he quite liked it, because he was allied very much to those great powers who maintained the shackles. But he had not really been taking advantage of his presence at the festive board in order to preach him a sermon; because he believed the Board of Trade was as eager to meet the industry's just demands as the industry was to put them forward. Whether the views of the two coincided was unknown to him. It would be a

great pleasure to find there was in Mr. Garnham Roper a supporter of the proposal to drink to the prosperity of the gas industry.

TROUBLES OF THE INDUSTRY—THE PROMISED BILL.

Mr. GARNHAM ROPER, C.B., said that one in his position was supposed not to be very talkative outside his office. Inside his office, he was supposed to have the eyes of a lynx, the scent of a bloodhound, be a very ready writer, and a fairly fluent talker. When outside, one was supposed to be dumb. Therefore, his position there that day was a peculiar one. He was outside the office; and he ought to say nothing. One was tempted to try to take advantage of this by simply concurring in what his Lordship had, in such eloquent and thoughtful words, conveyed to them. His Lordship had tried to get him to say something on behalf of the Government; but he was not the Government. He did not, however, merely like to say, in seconding the toast, that he concurred with the proposal. He felt that so much had happened in the last few years that something more than just a concurrence was called for. The Board of Trade had always had a great deal to do with gas undertakings. They had had a great deal to do with them during the war years; and this had not been peculiar to the Board of Trade. The Board was very familiar with the difficulties with which the industry had been struggling; and he was glad to have the opportunity of saying here how fully they recognized the spirit of patriotism and loyalty in circumstances where the members of the industry were perhaps not quite convinced the right thing was being done. Demands had been made by the Ministry of Munitions to give plenty of benzol, toluol, and other things; the Board of Agriculture came along and asked for as much sulphate of ammonia as the industry could give; the Admiralty had required liquid fuel; and the Board of Trade, owing to the shortage of coal and the demand for it, had had to tell the industry they could not give it so much coal as it had had, and as it felt it needed. Therefore, it had to use as economically as it could such coal as it could get. Then the industry had other difficulties. When the consumption of gas was cut-down the consumers complained; when the price of coal and labour went up, and compelled the raising of the price of gas, the consumers complained to the Board of Trade, and the Board complained to the industry. Then as the price of gas went up, dividends went down; and the shareholders complained. These things were, in the circumstances, inevitable; and he thought it wonderful how well the industry had complied with the demands made upon it. The troubles were not altogether passed; but he certainly considered that the present was much brighter than the past had for a long time been. Many of the gentlemen present had waited upon and so knew Sir Auckland Geddes; and he had asked him (Mr. Garnham Roper) to say how sorry he was that he could not be at the luncheon. Sir Auckland received very sympathetically the deputation from the industry in July; and he gave close consideration to the very important matters that were laid before him. He had since announced his intention to introduce legislation which, it was hoped, would be good for the community, as he felt sure it would be for the gas industry generally. How exactly the Bill would be drafted he did not know, because it was not drafted at present. Its form would be to some extent upon the recommendations of the Fuel Research Board. They were all aware of the important work that had been done by Sir George Beilby and the other members of the Board. He was glad to bear witness to the immense patience, industry, and ability which Sir George had personally given to the very difficult problems which had been referred to him and his Board to consider. He was glad to learn from him only that morning that some rather difficult, but incidental, points in connection with his recommendations were cleared up the previous day. He (Mr. Garnham Roper) thought this was rather a good omen for the Bill when it came forward. An agreed Bill had a much easier path in Parliament than one that was opposed. At any rate, some of the difficulties had been swept away before the Bill reached Parliament. The gas industry had, it seemed to him, been particularly fortunate in the men of scientific ability and business ability it had at its command—in fact, he might say that no great industry had had better assistance in this respect than the gas industry. He did not want to be tempted on to some of the lines Lord Moulton wished him to go on to, because his position was not quite strong enough for him to deal with these matters. The Board of Trade would do what they could to assist the Bill the Government were proposing, and which would deal not only with the method of charging for gas, but also with the revision of the sliding-scale, maximum price, and so on. In conclusion, he might say the gas industry had had a great past; and he felt sure, and he was sure, it had before it a very great future. It was a satisfaction to him that this toast was associated with the name of Mr. Milne Watson, who was not only a very vigilant partizan of the gas interests, but the Board of Trade had found that his broad views and his great knowledge of the subject had been of the utmost assistance to the Government.

BETWEEN THE GOVERNMENT AND THE MUNICIPALITIES.

Mr. D. MILNE WATSON, the President of the National Gas Council, said it was with very great pleasure that he rose to respond to the toast that had been so eloquently proposed by Lord Moulton, and seconded by Mr. Garnham Roper. Even the bravest of them must occasionally have doubts; even the most optimistic of them saw clouds on the horizon. He could assure the two gentlemen who had just spoken that their encouraging words had done a great deal to put those present in good heart. For himself, he had never had any doubt in regard to the prosperity of the gas industry. The industry was an absolutely integral part of the national life. It was the oldest industry possibly in the country; it had lived through more than a hundred years' strenuous existence; and long after all present had passed away, it would be still here, serving the public in an excellent way. Serious questions surrounded the industry; but he believed, with courage and patience, they would come through them. The gas industry had a splendid record of service. It had always been noted as a good employer. It had never had any difficulty with regard to obtaining labour. Men had always been anxious to work in the gas industry; and he considered the industry had been pioneers in many respects. One important matter was that they had linked-up, as no other industry in the country had done, co-partnership with their work; and though not all gas companies had co-partnership schemes, yet a very large number of the most important gas undertakings of the country had, and were working under the system. No doubt co-partnership might have its drawbacks—might not be a solution of all troubles, and might not be all that people claimed for it. But that it was on the right lines, the industry had no doubt. This was part of the industry s programme under which he thought it had rendered a national service. In addition to this, they had what no other industry had—a sliding-scale. It was not for him at this juncture to praise the sliding-scale, because it was the cause of most of their troubles that day. At the same time, under the great principle of the sliding-scale, there was a most important root idea; and he should be exceedingly sorry if anything happened to depreciate the idea in the country—to make it appear that the sliding-scale of price and dividend was a wrong idea. He thought it most important that at this juncture the sliding-scale should be put right, because if it was not, there was no doubt about it that in the future no other industry would ever consent to go under it. That afternoon he was due to speak at the Æolian Hall. Therefore he was sure those present would excuse much in the way of a speech on this occasion. But he must say, on behalf of the gas industry, how pleased they were to see so many people rallying round them. On his left, he had Mr. Garnham Roper, representing the Government; on his right, he had Sir Harry Haward, who in their recent negotiations led the representative municipal interests in the country. Now, in the hands of these two interests—the Government and the municipalities—rested largely the fate of the gas industry. He therefore sincerely hoped that, placed happily as the President of the National Gas Council was between the representatives of the Board of Trade and the London County Council, they were going to join hands, and in the near future promote such legislation as would ensure the prosperity of the gas industry for many long years to come. In the name of the industry, he thanked Lord Moulton and Mr. Garnham Roper for their encouraging words.

REPRESENTATIVES OF PUBLIC LIFE.

Sir GEORGE DAVIES, on behalf of the British Commercial Gas Association, offered a very cordial welcome to the visitors, and proposed their health. Their visitors that day were men distinguished in all branches of public life; and they showed by their presence that they were taking a very real interest in the development of the industry. The reason was that they were not meeting there as ordinary commercial men. The gas industry was a commercial undertaking, and a very important one. Directors of gas companies had a definite responsibility to their shareholders. But, after all, it was a limited responsibility, because they could not carry on their concerns in the way the directors of ordinary trading concerns could carry on their businesses, with the idea of making all the profit they reasonably could, because their powers were, as they had been reminded, very strictly limited. The directors of gas companies, however, were something more than ordinary directors; they were trustees of the public They were entrusted with certain powers in order that they should supply to the public a most important utility service which entered very largely into the life of the people. They could therefore heartily welcome the presence of those who were so much interested in the public life of the nation. They had present with them, as Mr. Goodenough reminded him, representatives of Government Departments, of municipal life, of the Law, of the Press, and of many of the other activities of public life. They very heartily welcomed them all.

RELATIONS WITH THE ELECTRICITY INDUSTRY.

Mr. E. VESEY KNOX, K.C., replying for the visitors, first thanked the President and Council for their kind hospitality, and secondly for the opportunity of meeting those who were concerned in the fortunes of the gas industry. He had had the honour of serving upon a Committee appointed by the Board of Trade to inquire into the electrical industry of this country, and to endeavour to sketch-out the lines of a scheme to improve it. Possibly the gas industry might count itself fortunate that it had not been subjected to any like inquiry. The Committee found it a difficult task—difficult to secure unanimity, sometimes at the expense of clarity in their expressions. But they did eventually produce a unanimous report. He was responsible for certain rather inadequate paragraphs referring to the relations between gas and electricity. They ventured to express the view that, though effective legislation had been one of the reasons why electricity had not made so much progress in this country as in others, another reason was because gas in this country had done so much better than in any other. Before the war the output of gas in this country was 232,000 million cubic feet per annum; while in Germany it was 90,000 millions. It had been a remarkable revelation to him the enormous predominance of the gas industry in this country over electricity. Further it was found that almost one in five of the total population of Great Britain was a gas consumer. This was a figure that could not be rivalled in any other country. It showed the enormous importance of the gas industry, and this was why electricity had had, comparatively speaking, second place. The further view was expressed that there ought to be more co-operation between gas and electricity than in the past; and he thought there was a great deal in this. There were many serious questions which had to be dealt with in the gas industry; but he ventured to suggest that the less control they had the better—that the freer development was, the better would be the development in future.

Mr. F. W. GOODENOUGH (Sir Hallewell Rogers having had to leave) proposed "The Chairman," and thanked him in the name of the Association for his valuable services. As Chairman of the Executive Committee, he was glad of the opportunity of thanking Lord Moulton for his constant helpfulness, his perfect courtesy, and the patient consideration he had given to all matters put before him.

Lord MOULTON, having thanked the members, congratulated them upon having secured one so high in the life of the country as Sir Robert Hadfield to be their President. His presence in the chair would add dignity to the Association. His own relations with the gas industry had been most pleasant. He had discovered a real eagerness after efficiency, and a cordiality which made memory very pleasant.

ELECTRICITY SUPPLY MEMORANDA.

THE "Electrical Review" is very much exercised. It has devoted three-and-a-half columns to investigating the claim of gas suppliers that gas is the fuel of the future. The affirmation of the claim will rest with the future, and not with the "Electrical Review," or its host of calculations. The public will decide, we firmly believe, as it is deciding under the conditions of to-day, that gas suppliers are justified in their claim. The thing that has stirred the "Review" into action is the announcement of the British Commercial Gas Association that the gas-works process has an efficiency of 70 to 80 p.ct., based on the heating values of the gas, coke, and tar produced. The "Review" has not shown that this is not the case, but has gone rambling through a lot of figures that are altogether fallacious, because, in the first place, our contemporary does not know precisely what it is talking about, and it adopts figures in relation to electricity which it knows perfectly well have no actual existence, and are not likely to have universally. Instead of presenting its readers with its silly jumble of figures, it had better have taken Sir Dugald Clerk's data, and shown him where he was wrong. It is quite easy to prove from day by day working—not on paper, but by accurate measurements of realized results—that the claim is true that the gas-works process has an efficiency of from 70 to 80 p.ct. The very figures that the "Review" uses show an efficiency of approximately 70 p.ct., taking the coal of to-day as having a thermal value of 13,000 B.Th.U. per pound. Gas-works supplying per ton of coal handled 15,000 c.ft. of mixed gas of 480 B.Th.U. put upon the market in the form of gas 7,200,000 B.Th.U.; have for sale 8 cwt. of coke, which at only 12,000 B.Th.U. per pound (which for normal coke before the war is low) is equal to 10,752,000 B.Th.U.; and the tar has a heating value of about 2,000,000 B.Th.U. These figures summed up make roundly 20,000,000 B.Th.U.; and 70 p.ct. of the original heating value of the coal is 20,300,000 B.Th.U. Prof. Bone, in his Cantor Lectures showed a case of 89 p.ct. efficiency in the vertical retort process of carbonization; and Sir Dugald Clerk, in his Society of Arts paper, gives instances of over 82 p.ct. One of the first mistakes the "Review" makes is to assume that from the 8 cwt. of coke is to be deducted the quantity of fuel required in manufacture. The 8 cwt. is the net amount for sale after deducting the quantity utilized in carbonizing and for steam-raising, or steaming charges, or for making water gas in a separate plant. Thus in this respect at the very start its figures want revising. By the modern method of gas making, those who are fortunate enough to have a vertical retort plant can make up to 22,000 c.ft. of (say) 425 B.Th.U. gas, some are actually going above this, according to the physical characteristics of the coal used. In this case 9,350,000 B.Th.U. are put into the gas-mains; and adding the thermal value of the coke and tar, we get to about 22,442,000 B.Th.U., which is close upon 80 p.ct. of the original value of the coal, if of 13,000 B.Th.U. per pound. When, if ever, we get back to about 8 p.ct. of ash in the coal, even better results will be obtained. No credit is taken for sulphate of ammonia, cyanogen, sulphur, and so on—all immensely useful, but do not come into the thermal balance.

Efficiency of the Carbonizing Process.

False Assumptions.

It seems that our contemporary sent out some questions to the Gas Light and Coke Company, the South Metropolitan Company, and the British Commercial Gas Association. It is grieved that two of the questions were not answered by the first-named Company. These questions were: What is the amount of coal gas which is obtained from 1 ton of coal? What is its calorific value? But there were three questions lower down which are the ones that cover all that is required for the purpose of comparison. They are: "What is the amount of mixed gas delivered to the public for every ton of coal destroyed [*sic*]? What is its calorific power? What is the amount of coke obtained from 1 ton of coal. After the word "obtained," there should have been inserted the words "for sale," because the "Review," meddling in things it does not understand, has made false deductions (as previously explained) from the coke for manufacturing purposes. It thinks that the object in not answering the first two questions is to hide the proportions of coal and water gas. That is a very stupid assumption. The proportions of coal and water gas are regularly published in the accounts of the Gas Light and Coke Company; and last year amounted to 24 p.ct. of the total make of 29,210,083,000 c.ft. On these figures our contemporary must alter its average of 18 p.ct. of carbon monoxide in the mixed gas. It makes a splutter about carbon monoxide. There are some towns in America where only water gas is supplied to the consumers. Carbon monoxide (which is always a product of the coal fire) is not intended any more for human consumption than electricity is for slaughtering people even at voltages down to 100. Electricity is keeping up its reputation for bringing about fatalities. Carbon monoxide is quite a respectable heating constituent of gas. The ignorant "Review" thinks that gas companies keep "mum" over the proportion of water gas supplied, with a very definite object in view. The contrary is the fact. The figures are not only published by gas undertakings, but they appear in the returns to the Board of Trade. Through the manufacture of water gas, much more fuel is made available throughout the country; and the electricity industry among other consumers of coal benefit accordingly by a reduction of the aggregate coal consumed. The "Review" makes a perfect mess of its fundamental calculations; but its readers may be left to choose between the heat efficiency it presents, of 36 p.ct. for gas and coke only for the gas-works process, or the 83 p.ct. (for gas and coke only) presented by such an acknowledged authority as Prof. Bone [see "JOURNAL," March 25 last, p. 633] or the 76 and 76 p.ct., also for gas and coke only, of Sir Dugald Clerk [*Ibid.*, p. 638].

More Unjustifiable Basic Figures.

Then our contemporary goes on to show that the consumer using a gas-oven, boiling-rings, and coke-boiler (it does not take the most efficient of gas appliances, the latest gas-ovens, the most efficient methods of water heating, and it ignores the high efficiency of gas-fires altogether) gets very poor efficiencies; and eventually it comes to the wrong conclusion that 14·66 p.ct. is the greatest amount that "we can use of the heat in the coal that the gas companies 'destroy,' against the 18 p.ct.—a very low estimate—which we get when using the products of the electricity companies." We like the audacity of electrical people talking of coal destruction by gas undertakings, and of the "products" [plural] of the electricity concerns. It is untrue to suggest that through electricity 18 p.ct. of the heat in the original coal is obtained by the consumer for heating purposes, and that this is a "very low estimate." It is nothing but a piece of gross extravagance, seeing that the average efficiency of the generating stations of the United Kingdom is only about 7 p.ct. Super-stations are not here yet; and when (if ever) they are, 20 p.ct. efficiency is not likely to obtain in them under the varying conditions of the country. The "Review" only compares the electric oven and kettles and other utensils with the heating elements incorporated in them; and it takes 90 to 95 p.ct. efficiency for the oven, and 97 p.ct. for the expensive element-incorporating utensils. Is this all honest? Is it honest to take 20 p.ct. efficiency for generating stations? Is it honest to take 90 to 95 p.ct. efficiency for all ovens? Is it honest to take 97 p.ct. for all electric kettles, saucepans, &c.? What of the efficiency of electric hot-plates? And do not the initial efficiencies greatly depreciate? We can only express surprise and regret to see such an article as this in the "Electrical Review." Rather than indulge in such calculations that are fundamentally wrong, it would be much more sensible to compare actual work done, and the cost of doing it, as well as the relation of the actual B.Th.U. involved to the thermal value of the original coal, making allowance (in the case of gas) for the other residuals produced. One electrical man tried this, and had a nasty fall. If the "Electrical Review" engaged in a public cooking (including oven and hot-plate work), water-heating, room-heating, &c., competition with gas, it would find more material for an article on this subject; but the article would have an appearance distinctly different from the present one. Suppose it tries. People who, through inadequate knowledge, deceive themselves or other people in the way the writer of the article in question has done, some time or other find cause for very genuine regrets.

Based on Large-Scale Experience.

The "Electrical Times" does not like the altered views of the National Kitchens Division of the Ministry of Food, based upon their experience of electric cooking on the large scale—a matter to which reference was made a fortnight since in the "Memoranda." This is such a change of front from the unctuous compliments paid to the politicians suffering from electrical delusions, that the worthy "Meteor" of our contemporary finds it difficult to swallow the very decisive statements of the Kitchens Division: (1) That owing to the serious alterations in prices, &c., the comparison made between gas and electricity in the "Handbook" formerly issued by the division should be ignored. (2) The division's experiences of electricity for cooking have been anything but favourable. (3) Gas appliances are more constantly reliable, and much cheaper to instal and maintain; and they consume less fuel. "Meteor" says that there are so many foolish assertions in small compass that he hardly knows where to begin a comment. 'Meteor" does not specify which are the "foolish assertions." Perhaps he thinks it wiser not to do so. If he will remember that the Kitchens Division has an experience with many types of electrical apparatus and in many places, and under the supervision of many different people, and that the electricity suppliers have taken an intimate interest amounting to motherly nursing in what has been done, he will at any rate appreciate that the division has not made its very explicit statement on evidence of a shallow character. If an electric cooker can be made to work "at 90 p.ct. efficiency on the basis of the goods delivered," the division would have found it out, and also whether it was even then cheaper and more reliable than other apparatus. But how does "Meteor" know that a cooker works at 90 p.ct. efficiency? Will he tell us just how it is ascertained. Efficiency is required elsewhere than inside an almost hermetically sealed and heavily padded oven, which is necessary to guard against the flight of dearly purchased B.Th.U. Besides, efficiency in relation to the electricity delivered to the oven must be taken together with the cost of the thermal value; and there are Government Departments that are looking into the efficient use of coal from the national point of view, and not only from the point of view of the electricity industry. The electricity industry once played both loudly and long on the "saving of meat" string; now it is going

for oven efficiency, and is bye-passing everything else. But these little games are soon exposed by experience.

Electric Fire Deception.

Berry's Electric, Ltd., have brought out what is called the "Magicoal" fire, which is designed to try to make householders believe by their eyes but not their bodies that they have before them something that is the equal of the coal fire. It is said that this fire has all the attractiveness of the open hearth type of fire, that there is in it the deep red glow of the coal fire, and that there is in it the resemblance of flickering flames. But it gives no appreciable heat, which is the primary purpose of a fire. It is a vain pretender; and the heat has to be supplied from a different source altogether. As the "Electrical Times" explains: "The optical illusion of the red-hot fire in the grate is produced by several red lamps covered with transparent, semi-transparent, and opaque crystals and lumps of coke and coal, while the flame effect is produced by rotating aluminium fans which reflect the light in a flickering manner. Other appliances supply the heat for actually warming the rooms, these usually being of the concealed type. Central heating systems are very suitable for use in connection with 'Magicoal' fires; but at the recent Shipping Exhibition, it could be seen in conjunction with a 3 KW. electric heater placed on the hearth in front of the fire, completing the illusion by giving out radiant heat." Who is going in for all this expensive make-believe, other than fools?

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

THE One-Hundred-and-Eighty-Fifth Quarterly Meeting of the Manchester District Institution of Gas Engineers was held at the Grand Hotel, Manchester, on Friday last—Mr. ARNOLD E. MOTTRAM (the President) occupying the chair.

NEW MEMBERS AND ASSOCIATE.

The first business of the meeting was the induction of Mr. William Fletcher (Garston) and Mr. Barton Arnold (Knottingley) as members, and Mr. Hector Turnbull (Scunthorpe) as an associate member. A hearty welcome to them was accorded.

APPOINTMENT OF SCRUTINEERS.

Messrs. J. K. Law (Marple Bridge) and W. A. Cartledge (Congleton) were appointed Scrutineers in respect of the election of officers.

APOLOGIES FOR NON-ATTENDANCE.

The HON. SECRETARY (Mr. G. S. Frith) announced that letters expressing regret for non-attendance had been received from, among others, Sir Dugald Clerk, Mr. H. Kendrick, and the Presidents and Secretaries of the various District Associations.

TAR DISPOSAL SCHEME.

The PRESIDENT then opened a discussion on the proposed tar scheme between producers and distillers, the draft agreement of which was published in the August report of the National Gas Council. The item had been put on the agenda to give members an opportunity of discussing the scheme before it went forward further. It was the last opportunity they would have before it was dealt with more definitely by the Committees which had it in hand. Personally, he would be very sorry if the scheme did not receive the attention that it really deserved. It was far more important, in his opinion, than a lot of members had given it credit for. In the Machester district there was a strong feeling against it, on the ground that it was not satisfactory. He would be sorry, however, for the scheme to be thrown out without giving it further attention. Clause 1 was as follows:

> Whereas the said parties were desirous of facilitating and economizing the production, collection, and distillation of coal tar, and the manufacture, distribution, and sale of distillates and products therefrom, and for these purposes have agreed [the National Gas Council and the Distillers' Committee on behalf of the producers and distillers respectively], in consideration of the mutual benefits and protection to be secured therein by them respectively, to enter into this agreement upon the terms and conditions hereinafter expressed.

With this clause they were surely in agreement. In the past, he did not think that the gas undertakings had got the benefit from their tar that they ought to have had. The tar distillers had obtained far more than their share. He had found out from his experience that they had had more than their share of the profits from tar so far as his own undertaking was concerned. They had, however, to do their best to arrive at a scheme which would be more favourable to the gas undertakings without doing an injustice to the distillers. He did not think they would have a very good discussion on the question that day; but the Committee had taken the opportunity offered by the meeting to bring the matter up. It would come before them again as members of the various branches of the National Gas Council. In any case, they would be pleased to hear any remarks on the subject that would guide the Committee.

The ensuing discussion was brief; and it was not deemed desirable that publication should be made of the statements of the speakers. The result, however, was that it was decided, on the suggestion of Mr. Samuel Tagg (Preston), that any considered criticisms of the draft agreement should be forwarded to Mr. Sillitoe, the Secretary of the Manchester District Executive Board of the National Gas Council before the meeting of that body to-day (Tuesday).

The following paper, by Mr. W. Buckley and Mr. F. S. Sinnatt, M.B.E., D.Sc., F.I.C., was then read by Mr. BUCKLEY.

IMPROVED METHODS FOR THE ANALYSIS OF COAL GAS.

Gentlemen,—When your Council honoured me by asking me to read a short paper on gas analysis, and to illustrate it by a demonstration, I felt it my duty to comply; and it was my intention to bring to your notice an apparatus which has been used in Manchester for about ten years. This apparatus has, in its modified form, given every satisfaction. Knowing that Captain Sinnatt had been working throughout this period on a similar apparatus for the analysis of gaseous mixtures, we consulted together, and thought that a joint paper on the modifications used by both of us would perhaps be of greater value to the members than two separate publications in the literature. We believe that the improvements lead to greater accuracy, and, what is even more important in our opinion, greater ease and rapidity in carrying out a complete analysis of coal gas.

Many points have to be considered when deciding upon the type of apparatus to be adopted for the analysis of such a gaseous mixture as coal gas, and many of the instruments employed for this purpose will yield accurate results in the hands of a skilled manipulator. One of the first essentials of the apparatus to be adopted should be simplicity of construction, and, secondly, ease of manipulation, in order that the minimum number of sources of error should be introduced during the analysis. By this means the apparatus becomes suitable to be employed in works where it is not the practice to engage a skilled chemist. In introducing to you the apparatus we favour, this has been one of the chief considerations—namely, that it should be possible for practically any scientific man to carry out the analysis of coal gas. It will be clear that, if estimations of a delicate character are required, some form of special apparatus will be necessary; but for ordinary technical volumetric analysis, the apparatus we are about to describe is entirely satisfactory.

The apparatus we wish to bring before your notice was described in its simplest form by Kont Smith and Towers;* and the main novelty consists in an ingenious absorption pipette which is most efficient in its action. The general arrangement of the apparatus, and the modifications we have introduced, are shown in fig. 1. As will be seen, the apparatus is simple, strong, and occupies little bench-space. Further, we can say, with complete confidence, that, in the hands of a careful operator, the results obtained are uniformly accurate. The burette is made to contain about 110 c.cm., and is graduated in 0·2 c.cm. It is fitted with a three-way tap at the top, and with a large well-ground tap at the bottom. In addition to this main tap, there is a second smaller tap, attached to the bend which leads directly into the burette. Fused to the side of the burette, below the 110 c.cm. mark, is a levelling tube, which is carried above the top of the burette, but should not be longer than 27 in. This tube is provided with a tap, which must be of the very best type in order to be able to stand considerable diminished pressure. This arrangement of the levelling tube brings the level of the mercury in it and the burette close together, which facilitates the correct adjustment of the two levels and the reading of the volume of gas in the burette. The fitting of the levelling tube with a well-ground glass tap enables it to be used in an entirely novel manner—*i.e.*, 100 c.cm. of gas may be obtained with great ease and accuracy. In order that the levelling tube may be placed quite close to the burette, and that the graduations on the front of the burette may not be interfered with, the terminals for sparking the contents of the burette are arranged at right angles to one another—one being placed on the left side, and the second at the back of the burette (fig. 1A). This has been found to act quite as efficiently as the ordinary method, where the terminals are placed at 180° to one another, and no short-circuiting has been experienced.

The arrangements of the levelling tube described above make it possible for both this and the burette to be placed inside the water jacket. The latter is fitted with an inlet, and a higher and lower outlet. By this means the level of the water may be brought below the terminals when it is necessary to use them. A thermometer should be suspended in the liquid, in a position where rapid observation of the temperature is possible. Attention to this detail is of vital importance, and every care should

* See "Journal of the Society of Chemical Industry," 1897, p. 400.

be taken to note the temperature of the water before and after each reagent has been applied. Should the temperature have altered, then the necessary correction must be made. In order to emphasize the importance of this feature, it must be remembered that gas expands or contracts 1/273 of its volume for every rise or fall of 1° C., which is equal to 0·36 c.cm. per 100 c.cm. of gas. The effect of a change of temperature of (say) 1° C. is shown by the following example: After the absorption of oxygen from the gas, it is found that there is a reduction in volume of 0·2 c.cm.; but on observing the temperature, it is noted that a rise of 1° C. has occurred. It is assumed that 100 c.cm. of gas have been taken for the examination. Thus, a rise of 1° C. would represent 0·3 c.cm. of gas. Therefore, the actual percentage of oxygen present in the sample would be 0·5, and not 0·2. Failure to note changes of temperature is one of the chief sources of error in gas analysis. The temperature of the water in the water-jacket may be kept quite constant by installing an overhead tank of sufficient capacity to maintain the flow of water during the period occupied by the complete analysis.

The second feature of all apparatus using mercury is the necessity for complete cleanliness, in order that the terminals used for explosion and the inside of the burette should be quite satisfactory. For this reason the special tap E is attached to the bend leading into the burette—called, for reference, the flush-out tap. In our opinion, after each analysis, it is advisable to wash-out the burette with a small volume of very dilute nitric acid, or a small volume of dilute sulphuric acid—either may be used. In order to do this, the mercury bulb is placed in its lower position, and, by opening the main tap, a small volume of acid is drawn into the burette. When the level of the mercury reaches the lower end of the burette, the main tap B is closed, and the flush-out tap E is opened. The small volume of mercury which has been in contact with the acid is allowed to flow into a receiver, which also collects the water used to flush-out the burette. The burette is then flushed-out with water until quite clean. This operation of washing-out the burette occupies but a few moments; but, in our opinion, it is a most important detail in the manipulation of the apparatus.

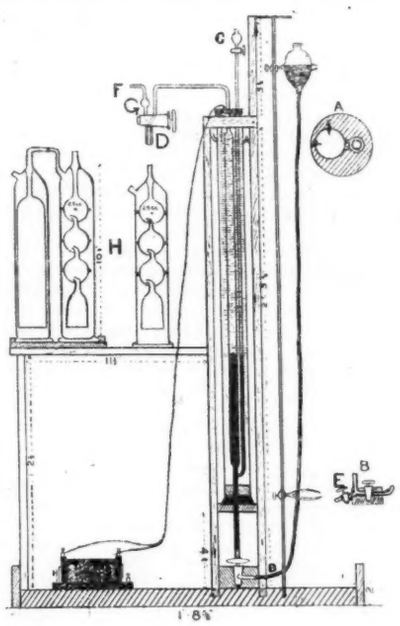


Fig. 1.

The whole of the taps on the apparatus must obviously be well ground, and, in addition, be kept both clean and lubricated. The lubricant that we use is made as follows: Twelve parts of vaseline and one part of paraffin wax are melted in a small porcelain dish. Nine or ten parts of black rubber shreds are then added, and the liquid thoroughly stirred. The rubber portion of the shreds dissolves in the vaseline and paraffin wax, leaving the inorganic constituents behind. While still molten, the lubricant is poured into a container, and allowed to cool. This lubricant keeps practically indefinitely, and only a very small amount is required to lubricate the taps thoroughly.

The apparatus may be mounted in a wooden structure, as shown in fig. 1, or on a retort stand by means of clamps and supports. It is only necessary to provide for two positions for the mercury bulb. In the upper one, the mercury should just fill the burette; while in the lower position it should be possible to remove the gas from the sulphuric acid pipette. The whole of the manipulation of the apparatus is controlled by the main tap B.

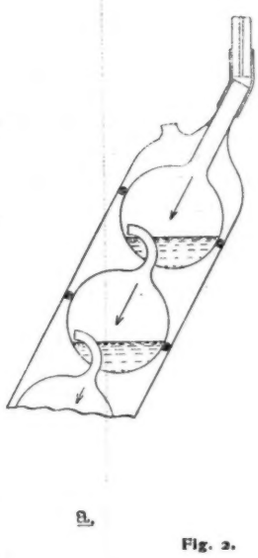
METHOD OF OBTAINING 100 C.CM. OF GAS.

The method we have devised to obtain 100 c.cm. of gas is, we believe, quite novel. The mercury bulb is raised, and the side tube filled until mercury passes through the bore of the tap C, which is then closed. At the same time the burette is filled with mercury until it passes through the bore of the tap D, which is then closed. The side tube is now allowed to remain full of mercury throughout the remainder of the operations of obtaining the 100 c.cm. of gas; and as it is filled with mercury it is completely put out of action—the effect being the same as if the side tube were fitted with a tap at its lower end.

The burette is now connected with the supply of gas, which is allowed to flow into it at a slow rate. The usual manipulation is then proceeded with—namely, a greater volume than 100 c.cm. is taken, and the tap D closed. The levelling bulb is raised slightly, and the mercury is allowed to flow into the burette until the gas occupies exactly 100 c.cm., after which the main tap is closed, and the upper one D opened to the atmosphere for a moment. The slight excess of gas present in the burette passes into the air, and the tap D is then closed. The gas in the burette is now at atmospheric pressure, and occupies exactly 100 c.cm. This should be confirmed by opening the tap C, and adjusting the levels of the mercury in the burette and in the side tube. Before reading the level of the mercury, it should be the practice always to have allowed the mercury to flow into the burette when adjusting the levels. By this means, the miniscus of the mercury in the levelling tube and in the burette are always in the same condition. It has been found that the manipulation described above and the method of using the side levelling tube have certain marked advantages over the general method of working this apparatus.

METHOD OF MANIPULATING THE PIPETTES.

A pipette containing the required reagent is connected to the burette at D by a short length of pressure tubing, and the tap on the burette turned so that connection is made with the outlet tube F. Gentle suction is then applied to F, and the pipette filled with the reagent; the suction being continued until the small bulb G is partially filled. The tap should then be turned so that the pipette and burette are in communication, and the gas then transferred from the burette to the pipette by opening the main tap B and closing the tap D when the mercury reaches it.


a.

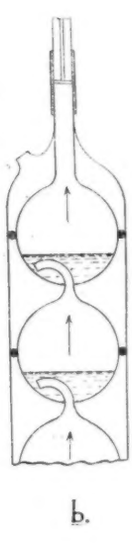

b.

Fig. 2.

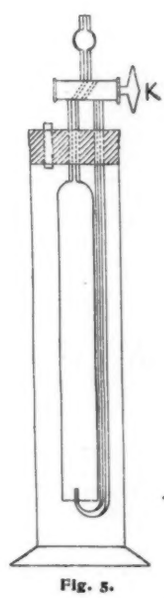


Fig. 3.

We wish to draw attention to two modifications of the original Kent-Smith pipettes, which have been found to be more convenient in a number of ways than the one originally described (fig. 2). The first, shown in fig. 1A and fig. 2, contains four bulbs. The three upper ones are each 25 c.c. capacity and spherical in shape; the lowest bulb being cylindrical in form. The connecting tube between each of the bulbs is bent in the form of a hook, having a diameter of not less than ¼ in. These hooks should all point in the same direction. The pipette is attached to the burette by a short length of pressure tubing, and the tap on the latter is turned so that connection is made with the small bulb G. A short length of india-rubber tubing is attached to F, and gentle suction applied until the pipette and the small bulb are filled with the reagent. The tap D is then closed. The necessary taps are then opened and the gas allowed to pass into the pipette. During this proceeding the pipette should be held at an angle of about 30° (fig. 2), by which means the ends of the bent tube in each bulb will be raised above the liquid as soon as a certain volume of gas has passed into it. [The volume of liquid forced from each of the upper bulbs depends upon the angle to which the pipette is inclined.] The gas therefore passes into each bulb in succession, until a portion collects in the lowest receiver. When the whole of the gas in the burette has been transferred to the pipette, the latter is made to assume a vertical position. This brings the ends of the bent tubes under the surface of the liquid in each bulb (fig. 2B). The pipette may then be gently agitated so as to aid absorption.

When it is desired to draw the gas into the burette, the pipette is left in a vertical position. By this means the gas is forced to bubble in minute bubbles through the liquid in the three upper bulbs, and thus the degree of contact between the liquid and the gas is very greatly increased. We believe that this pipette and the method of using it are quite novel.

MANIPULATION OF THE SPECIAL PIPETTE FOR THE ABSORPTION OF CARBON MONOXIDE.

Owing to the difficulty of completely removing carbon monoxide from coal gas, it is always necessary to use two separate pipettes —the first to remove the larger proportion of the carbon monoxide, and the second, containing a fresh solution, to eliminate the last traces. To facilitate the rapid removal of this constituent, we suggest that the pipette illustrated in fig. 3 should be adopted. By means of the three-way tap at the top of the pipette, it is possible to force the gas under examination through the deep column of liquid into the pipette in the form of fine bubbles. The pipette is connected to the burette and the tap D turned, so that communication is made between the air and the pipette. Suction is applied at F, and the reagent drawn through the side capillary tube first, and then the collecting tube, until the small bulb G is partially filled. The taps D and K are then closed, and when the mercury bulb has been placed in the higher position, these taps are so adjusted that the gas is forced down the capillary tube, which is drawn out to a fine capillary at the end. The gas now bubbles through the column of solution; and this comes into intimate contact with it. In order to transfer the gas back into the burette, it is drawn from the collecting tube until the small bulb above the tap K is about half full. The tap is now reversed, the small volume of gas contained in the capillary tube is forced to pass through the absorbent in the bulb on its way to the burette. The manipulation may appear somewhat complicated; but in practice it is very simple.

ABSORBENTS USED IN THE ANALYSIS OF COAL GAS.

It is not our intention to mention the many absorbents which have been suggested for use in coal-gas analysis; but the following are necessary:

Carbon Dioxide.—A solution containing 30 p.ct. of caustic soda or potash (potash purified by alcohol should not be used).

Oxygen.—A solution of alkaline pyrogallic acid prepared by dissolving 10 grams of pyrogallic acid in the minimum volume of water, and adding to this sufficient of the caustic soda solution mentioned above to make 150 c.cm. This solution shows no tendency to evolve carbon monoxide during the absorption of oxygen.

Unsaturated Hydrocarbons (Illuminants).—Fuming sulphuric acid containing 20 p.ct. of sulphur trioxide. After applying this absorbent, the gas should be passed into the caustic soda pipette to remove any acid fumes which may be present.

Carbon Monoxide.—Cuprous chloride solution prepared by dissolving 35 grams of cuprous chlorine in 200 c.cm. of hydrochloric acid. This solution is placed in the pipette, and strips of copper foil introduced. At the expiration of 48 hours, the solution should be perfectly colourless. For an alkaline solution of cuprous chloride, 250 grams of ammonium chloride are dissolved in 750 c.cm. of water, and the solution allowed to attain the atmospheric temperature. Then 200 grams of cuprous chloride are added, and the liquid intimately mixed. Ammonia is next added in small quantities until the precipitate produced almost disappears. About 250 c.cm. of ammonia will be required.

The remaining constituents are hydrogen, methane (containing a little ethane), and nitrogen. The ethane is generally returned as methane. These gases are estimated by exploding an aliquot portion of the residual gas with oxygen or air. The contraction after the explosion having been noted, the residual gas is passed into caustic soda, where the carbon dioxide produced by the combustion of the methane is absorbed. On returning the residue to the burette, the volume of the carbon dioxide is shown by the reduction in volume.

The following equations express the change which occurs when methane and hydrogen are exploded with oxygen:

$$\underset{\text{2 vols. 4 vols.}}{CH_4 + 2O_2} = \underset{\text{2 vols. liquid.}}{CO_2 + 2H_2O.}$$

$$\underset{\text{4 vols. 2 vols.}}{2H_2 + O_2} = \underset{\text{liquid.}}{2H_2O}$$

When methane is oxidized, it unites with twice its volume of oxygen, producing at the same time an equal volume of carbon dioxide, and as the water formed during the combustion condenses in the burette, it may be neglected. The volume of carbon dioxide found in the gas after the explosion therefore represents the number of cubic centimetres of methane present in the aliquot part of the gas taken for the explosion. A simple calculation shows the volume of methane in the total residual gas, which of course represents the 100 c.cm. of coal gas taken originally, and consequently makes the volume of methane into a percentage. Twice the volume of carbon dioxide produced represents the number of cubic centimetres of oxygen required for the oxidation of the methane; and if this figure is deducted from the first contraction, the difference represents the contraction due to the oxidation of the hydrogen. Two-thirds of this contraction is due to hydrogen, which in this case is the volume which is present in the aliquot part of the residual gas.

EXAMPLE OF AN ANALYSIS OF COAL GAS.

Volume of Gas taken, 100 c.cm. *Temperature of Water* = 13·8° C.

			Per Cent. by Volume.
After treatment with caustic soda	97·2 c.cm.	Diminution (CO_2)	= 2·8
" " " alkaline pyrogallic acid	97·0	" (O)	= 0·2
" " " fuming sulphuric acid	94·5	" (C_nH_m)	= 2·5
" " cuprous chloride	84·8		
" " " "	83·4		
" " " "	82·8		
" " " "	82·6		
" " " "	82·6	" (CO)	= 11·9
Volume of residual gas	82·6		
" gas taken for explosion	24·6		
" gas and oxygen	94·4		
" gas after explosion	55·3	1st contraction = 39·1 c.cm.	
Volume of gas after absorption with caustic soda	48·2	2nd contraction = 7·1 c.cm.	

24·8 : 82·6 :: 7·1 : x = 23·6 Methane . . . . = 23·6

39·1 − 14·2 = 24·9 = contraction due to union of hydrogen and oxygen.

$\frac{24·9}{3}$ = 8·3 × 2 = 16·6 c.cm = hydrogen.

24·8 : 82·6 :: 16·6 : x = 55·29 Hydrogen . . . = 55·3

Nitrogen by difference = 3·7

100·0

It will be observed that the nitrogen is obtained by difference; and though it is recognized that there may be objections to this practice—especially when using certain types of gas analysis apparatus—it has been found that the apparatus we have described gives results which compare very closely with check tests in which this constituent has been estimated in an apparatus specially designed for the purpose. It must be remembered that the apparatus we have described contains no error due to the capillary connecting the burette and the pipette being filled with air, and the absorbent in the pipette and the gas are directly in contact. Throughout the reading of this paper, emphasis has been laid upon the necessity for attention to detail; and if the preceding constituents in the gaseous mixture have been correctly estimated, then the percentage of nitrogen found by difference must be correct. When it is desired to estimate the nitrogen directly, the apparatus devised by Dr. Davidson, late of Birmingham Corporation Gas-Works, is strongly recommended.

The analysis of a sample of gas, though in itself a series of simple operations, demands in our opinion more sustained manipulative skill than any other test carried out in the gas-works laboratory. But when correctly performed the results will be of great assistance to the engineer. These results require interpreting into the language of the actual practice on the works; and this necessitates a knowledge of the conditions which may prevail in the retort and exhauster house, and their influence upon the composition of the gas.

It was our intention to have dealt in detail with the value of the knowledge obtained from the compositions of coal gas, not only for the purpose of controlling the carbonizing plant, but also as helping to elucidate problems which occur in the district of supply. It has been found, however, that the subject is too wide for the present paper; and therefore we content ourselves with placing before you some typical analyses of coal gas, upon which a few observations are made.

—	CO_2	O_2	C_nH_m	CO	CH_4	H	N
1 . . .	2·8	0·2	3·3	6·2	31·9	43·2	12·4
2 . . .	2·6	0·2	4·8	12·2	30·8	43·8	5·6
3 . . .	4·2	0·1	5·3	11 8	25·8	33·3	19·4
4 . . .	3·6	0·5	5·3	10·7	25·2	40·4	14·3
5 . . .	3·2	1·2	6·0	16·2	23·9	40·1	9·4
6 . . .	2·6	*nil*	3·5	7·9	30·2	52·8	3·0
7 . . .	4·1	0·1	2·0	19·5	17·5	50·3	6·5
8 . . .	3·2	0·1	2·3	21·6	18·2	52 0	2·0
9 . . .	3·6	*nil*	2·1	20·9	16·5	54·9	2·0
10 . . .	5·4	0·2	3·2	10·2	22·6	54·4	4·0

1.—A sample of coal gas produced in horizontal retorts, the temperature of which has not been excessive.

2.—A mixture of good coal gas with some water gas. This is indicated by the high percentage of carbon monoxide and illuminants.

3.—Coal gas to which has been added some water gas, and with the addition of what may be called "exhauster gas."

4.—Another example of a similar character.

5.—This sample of gas was taken in order to explain the cause of trouble at the works where the gas was being used to heat a pot of metal required for tempering drills. Owing to the high carbon monoxide present, the flames produced were too short for the purpose. The remedy was found in slightly opening the gas-nipples, when the required temperature of 1700° Fahr. was easily maintained.

6.—Gas produced in vertical retorts, without steaming. The amount of gas made was 13,000 c.ft. per ton.

7.—Gas produced on the same vertical retort three years later, after the introduction of steaming. The yield has been increased to 20,000 c.ft. per ton. Note the high carbon monoxide and hydrogen contents, and the low percentage of nitrogen.

8.—Another example of vertical retort gas with steaming.

9.—Still another example of the same type of gas.
10.—Gas obtained by steaming in horizontal retorts. Carbon dioxide has not been reduced as efficiently as in the vertical retorts.

It is a matter of some importance to calculate the calorific value of gas from the chemical composition; and the following values have been used for a number of years, and have yielded results frequently within 1 p.ct. of the calorific value as determined in a standard calorimeter.

	B.Th.U. per Cubic Foot.
Carbon monoxide	321
Hydrogen	321
Unsaturated hydrocarbons (illuminants)	2319
Methane	1003

In conclusion, we take the liberty of placing before this important section a suggestion which may perhaps be worthy of consideration. It is generally recognized that if the coal industry is to maintain its position in the forefront it must recover from the coal it is using the maximum yield of products of every type. With the great increase in the price of coal, it becomes more and more important that the work should be governed as scientifically as possible. Engineers would be greatly helped if they had chemists at their call who could advise them on the more complicated chemical aspects of the industry. This Institution, we understand, represents about 200 undertakings, 115 of which produce less than 100 million c.ft. of gas per annum. Many of these small works are not in a position to equip a laboratory or employ a skilled chemist.

Is it not possible for the Institution to establish its own central laboratory, to which the smaller gas undertakings could submit samples for examination? Not only could samples of coal gas, coke, tar, ammoniacal liquor, and oxide of iron be valued, but the chemist in charge could be called upon to visit works that needed his services to carry out special tests or research work, and report on the efficiency of a particular piece of plant. A scale of fees, controlled by the Institution, could be arranged, so that the central laboratory would be entirely self-supporting. When it is remembered that most industries connected with coal are having investigations carried out into the more scientific use of this national asset, it appears to us that the gas industry is the one which should be in the van of such a movement.

We make these remarks with great diffidence, and have left ourselves open to serious criticism. But we feel that an industry which has always been in the front will not allow itself to slip into the background, and we suggest that one of the greatest needs is a wider use of the chemist and his results. We feel, further, that every engineer in the country should be able to state the composition and calorific value of the product he is selling, just as readily as he can state the yield per ton.

Captain SINNATT, at the close of the paper, said he need not say how greatly honoured he was to come before the members of the Institution that afternoon. He felt the more honoured because it was often a very difficult matter to get the Committee's permission to give a paper. This was a weakness with the Institution. At the Manchester College of Technology quite a lot of research on coal was going on; and some of the results ought to interest the members. If he could have the opportunity of bringing papers before the Institution, embodying some of the results of this research work, he would be greatly honoured. Regarding the paper on gas analysis, Mr. Buckley's description of the apparatus was quite sound. The apparatus described was built for him (Captain Sinnatt); and the pre-war price, including four pipettes, was £4 10s. His idea at the time was to have available some apparatus which was cheap and accurate. What he wanted to suggest was that they should buy the necessary glassware and fit their own woodwork round it. One or two members had already used the particular apparatus; so that they would be able to speak of it.

Discussion.

The PRESIDENT, in declaring the paper open for discussion, said he thought they could promise Captain Sinnatt that he would not have cause to complain in the future. So long as they had a willing man, they would find him work to do.

Mr. SAMUEL TAGG (Preston), in thanking Mr. Buckley for his valuable contribution, said the Council had invited him to submit the paper in view of the importance of gas analysis at the moment. They all knew that the Board of Trade would shortly bring legislation forward to make the matter of inert materials in gas of very great importance. The prospect of penalties attached to gas containing more than a prescribed percentage of inerts made it important that they should investigate methods for determining the amounts present, and also processes for making gas containing as low a percentage of inert materials as possible. The paper was therefore of the very greatest importance. He would like to know if the apparatus was made by all makers to-day. He would also like to ask whether the method of nitrogen determination developed by Dr. Davidson saved much time. If it was a question of inerts purely and simply, it might be desirable to have a simpler determination of these only. As a member of the Council of the Institution he could only endorse what their President had said—that they would welcome further papers from Captain Sinnatt.

Mr. H. E. BLOOR (York) stated that Captain Sinnatt had let himself into a hornet's nest completely. If there was one industry more than another that at the present time heartily welcomed contributions relating to the scientific development of the industry, it was that concerned with the manufacture of gas. In London recently he heard from a certain gentleman that he was unaware of any body of men who showed a keener desire for scientific information than those associated with the gas industry. Captain Sinnatt could be assured of a welcome for any communications that he made to them. With regard to the paper, it was an excellent suggestion that the demonstration should be given, because it would be necessary that an entire change of outlook should take place in a large number of works, not necessarily small ones, because he knew one or two gentlemen connected with the gas industry—business men—who looked blank when the question of inerts came up. He was sure they were all willing to be made more scientific—they all saw the need. They had grasped the fact that they would have to work on a higher scientific plane. The contribution was cordially to be welcomed.

Mr. TIM DUXBURY (Oldham) said the subject of the paper was one of those to which they would have to pay very special attention in the future—much more so than in the past. It was very important for the retort-house to know what the laboratory was doing; and gas analysis could only be carried out in the laboratory. They knew what they were doing in the retort-house if they knew something of the composition of the gas. He would particularly look forward to a paper from Captain Sinnatt; and he was sure they all would. Eight or ten years ago, Captain Sinnatt made the request that he should be permitted to spend his holidays on their gas-works. They allowed him to do so, and he heard him say that it had been one of the best holidays he had had for some time. They ought to invite chemists employed on gas-works to hear any paper that Captain Sinnatt might bring forward. Any results they heard would be on the right lines.

Mr. C. M. D. BELTON (Macclesfield) said he was one of the pupils of Captain Sinnatt who had used the apparatus many times. As Mr. Buckley and Captain Sinnatt had said, a great point in gas analysis was careful manipulation. With such manipulation, they could get excellent and reliable results, even with the old type of apparatus. The essential call for accurate gas analysis with modern carbonizing methods could not be emphasized too strongly. The work which was being done at Macclesfield to develop the make of gas from 13,000 to 20,000 c.ft. was only possible by the constant use of gas analysis. By careful deductions from the results of the analyses, they had been able to work the plant to a nicety. In reference to the latter part of the paper regarding the establishment of a central laboratory, if results were going to be obtained in small works comparable with large works, a central laboratory was essential. It was also essential that whoever was in charge of the small works should have sufficient technical and scientific knowledge to appreciate the results obtained in the central laboratory. The scientific training of the engineer in the small gas-works had been neglected.

Mr. J. H. BREARLEY (Southport) said he would like to bring to the front the suggestion of a central laboratory. He did not think sufficient had been said about it in the discussion. It was too important a suggestion to be left where it was. He would suggest that the Committee of the Institution should consider whether it was possible to establish a central laboratory for small works. They did not want to get into the habit in the Provinces of relying too much on London for a lead. It was all a question of educating the boards of directors and committees to the fact that they would find it a profitable undertaking to have a central laboratory. He was on a works recently, making nearly 100 million c.ft. of gas, and there was not a piece of apparatus there—not even a calorimeter. These things were keeping the gas industry back. It was the work of the District Gas Associations to emphasize the importance of these things. The Committee of the Manchester Institution might possibly make some inquiry as to what kind of chemical equipment there was on works producing below 100 million c.ft. It might seem cheeky to ask the managers of such works for information of this kind; but if there were the right spirit the information might be secured. The managers might be asked at the same time if they were prepared to support a proposal for the establishment of a central laboratory.

Mr. S. MEUNIER (Stockport) said he would like to support the suggestion of a central laboratory. The longer one was connected with the gas industry, the more one began to realize that they were developing to scientific management. Chemistry was essential at every twist and turn. They were up-against high prices and high wages; and the only way to help the industry along was to get scientific research into all their processes, and to get the very best results it was possible to obtain. He certainly thought that the suggestion was a very good one. In his opinion, it was perfectly practicable; and he saw no reason why steps should not be taken to bring about the establishment of a central laboratory. He saw no reason also why even the larger works should not have some benefit from such a laboratory. The Council should take the matter in hand as soon as possible.

Mr. A. W. BRANSON (Pontefract) said the paper had been instructive; and they had all benefited by it. It had occurred to him that chemists on gas-works were not given sufficient incentive to do as much as they could. He was rather afraid that they did not get the necessary push that they required from the heads of departments. The suggestion of a central laboratory might be made use of. At the same time, they might take a tip from Germany. In Gemany, they had a very good method of encouraging scientific research by payment for results. Some such method here would be very beneficial.

The PRESIDENT said he thought the question would be taken up by the Council. They had, he considered, already got such a laboratory in Captain Sinnatt and his numerous assistants at the Manchester College of Technology.

Mr. BUCKLEY, who briefly replied to the discussion, said they were in negotiation with people who would probably place the apparatus on the market. They would let the industry know when the time was ripe for applying for it. This would be very shortly, he hoped. With regard to Dr. Davidson's test, they could do a test in twenty minutes. It was a very rapid method. He was pleased to hear the remarks concerning the suggested central laboratory. It was necessary that they in Manchester should be the first to inauguate the movement. Seeing that Manchester during the whole of the history of gas making had been as much ahead as most towns, it would certainly be very gratifying if the Institution should be the first to inaugurate such a

system of central laboratories. Personally, he thought they would serve an extremely useful purpose. Not only could samples be sent, but the chemist in charge could go down to the works and examine the plant and processes. The matter should receive very careful consideration. He was hoping there would be some adverse criticism of the paper. There were some points open to criticism, and which were purposely left open in the hope of receiving criticism. They had evidently missed fire; but in all probability the points would be dealt with in the Technical Press.

Captain SINNATT stated that the question of a central laboratory touched a vital spot. There was not a doubt in his mind that it would be one of the greatest advances that could be made. It would not only do the small works good, but also the large ones. Chemistry was a very, very broad subject; and it was bad for men to become stereotyped. If a chemist did not know everything about gas, then he should be kicked out. The whole industry—the chemical side of it, at any rate—would advance alongside of the central laboratory. Various other industries had already got such laboratories. Twenty pounds a year for a hundred members was £2000, which would cover everything. Twenty pounds a year was not absolutely breaking! They could run the best central laboratory in England on what this sum would represent from a hundred members.

VOTE OF THANKS TO THE AUTHORS.

Mr. ISAAC CARR (Widnes), in moving a vote of thanks to the authors, said he had listened to the paper with very great pleasure and instruction. It brought him back to the good old pre-war days. On the question of a central laboratory, it was a matter for regret that such a laboratory had not been established years ago.

Mr. W. B. M'LUSKY (Halifax), in seconding the vote of thanks, said he had heard the paper with great interest. With the consent of the President, he had brought some of his assistants to the meeting to get the fullest advantage from the paper. Mr. Buckley could depend upon it that he would get criticism later. It was a common thing for gas engineers to discuss the papers outside. Regarding the central laboratory, he supposed they would be aware that Manchester would not be the first to start such a scheme. It had already had a good start in the North British Association of Gas Managers. If they did not get any evidence of jealousy, they would at least get competition; and that would be a good thing for the gas industry.

The vote of thanks to the author was carried with acclamation.

ELECTION OF OFFICERS.

The report of the Scrutineers (Messrs. Law and Cartledge) on the election of officers was as follows:

President.—Mr. E. H. Hudson, of Normanton.
Vice-Presidents.—Mr. Samuel Tagg, of Preston, and Mr. Harold Davies, of Chesterfield.
Hon. Treasurer.—Mr. T. Banbury Hall, of Rochdale.
Hon. Secretary.—Mr. G. S. Frith, of Runcorn.
Committee.—Messrs. R. B. Braddock, of Radcliffe; William Buckley, of Droylsden; and F. H. Robinson, of Harrogate.
Auditors—Messrs. Charles Potts, of Hyde, and William Hill, of Stalybridge.

MIDLAND JUNIOR GAS ASSOCIATION.

Opening Meeting of the Session.

The first meeting of the session of the Midland Junior Gas Association took place last Saturday week, in the Reading Room of the Gas Department Offices, Birmingham. The attendance was representative; about forty members being present.

INDUCTION OF THE NEW PRESIDENT.

Mr. T. H. POULSON (Stafford), the retiring President, inducted the new President (Mr. C. Carrington Barber, of Birmingham). Mr. Barber had, he said, been a member of the Association since the beginning, and they much appreciated his practical interest. An excellent programme had been arranged for the session; and he thought they could look forward to much successful work.

THE RETIRING PRESIDENT THANKED.

Mr. BARBER, on taking the chair, moved a vote of thanks to Mr. Poulson, observing that the success of the season's activities was due in no small measure to his practical aid.

Mr. PICKERING (Birmingham), the Senior Vice-President, in seconding the vote of thanks, referred to the interim report of the activities of the Association, which had been circulated among the members, as being evidence of important work done by the officers of the Association, apart from the general meetings. He remarked that Mr. Poulson would remember his year of office as seeing the end of the great war, which had enabled them all to devote more energy to the consideration of ideas for the future welfare of the Junior Gas Associations; and their thanks were particularly due to Mr. Poulson for special work in this connection.

The vote was enthusiastically accorded.

Mr. POULSON, in acknowledgment, said he was proud to be able to look back on his year of office, which was alike pleasant and successful. It was his duty to do all he could for the Association; and he gratefully acknowledged the help given to him by the other officers. He looked forward to the time when their individual Junior Associations would cease to exist as such, but would form sections of one large body, with some inclusive title. This policy would, he thought, make the Junior Associations more valuable than at present.

THE PRESIDENTIAL ADDRESS.

Mr. CARRINGTON BARBER then delivered his inaugural address. This appeared in the "JOURNAL" last week, pp. 189-90.

Mr. POULSON proposed a hearty vote of thanks to Mr. Barber for his interesting address. There were many important points he had noted, especially Mr. Barber's reference to the use of machinery and labour-saving devices generally. He asked the President whether the use of coke dust for the boilers had occasioned any trouble with the grates, and whether the coke dust was used alone or mixed with slack. The quality of coal was an exceedingly important matter; and he thought that in the future some arrangement with a view to purchases on the basis of analysis would be instituted. As regarded the supply of gas to consumers, they should endeavour to keep not only consistent quality, but steady pressure also.

Mr. BATT (Birmingham), Junior Vice-President, seconded the vote of thanks. Speaking as from the distribution side of the industry, in reference to gas quality, he hoped that those on the manufacturing side would soon be able to give them gas which would occasion no naphthalene troubles.

Mr. W. G. S. CRANMER (Willenhall), in supporting the vote, said he was not a believer in low-grade gas. In his district there were many consumers' premises where conditions of work precluded the use of any but flat-flame burners; and it meant either giving them a decent quality gas or their adoption of electricity for lighting. The ideal of a gas supply of consistent quality and pressure was one they should all strive to realize.

The vote of thanks was then warmly accorded.

The PRESIDENT, in reply, speaking of the quality of the gas, said they had to find out what was the best figure to maintain, having regard not only to make per ton of heat units as gas, but also to the yield of residuals. In reply to Mr. Poulson, he said they had had no trouble with the boiler grates in using coke dust. The latter was used alone, after passing through a ¼ in. screen.

German Coal for France.

The French Professional Gas Syndicate, according to the "Journal des Usines à Gaz," have been asked by the Controller General of the Rhine Provinces to state the coal requirements of the gas industry, and what quantities it would be advantageous to import from Germany. The President has, needless to say, taken this opportunity to call attention to the serious crisis in the industry owing to coal shortage, and the necessity of increasing the quantities of German coal provided for in the Peace Treaty.

War Damage in France.

According to the "Journal des Usines à Gaz," the Special Commission on this subject appointed by the Professional Gas Syndicate have completed their report, the chief object of which is to direct into proper channels the discussion which is to take place in an Official Commission appointed by the Ministry of the Interior. One of the chief difficulties will be the liquidation of old contracts, and the establishment of new ones. The Commission have also prepared a schedule of prices which will be claimed in indemnification for the various products which were requisitioned by the enemy in occupied territory. The Syndicate has recently opened at Paris a special office to assist gas undertakings in obtaining facilities for the reconstruction or repair of their works.

The "Leeds" System of Vertical Retorts at Taunton.—A bench comprising three beds of eights, and one of four retorts, 28 in all, representing a carbonizing capacity of 50 tons of coal per 24 hours, adopted for use of the Settle down-steaming process is on hand for erection at the Taunton Gas-Works, under the superintendence of Mr. C. Harris, lately appointed Engineer and Manager in place of Mr. A. Edwards, who has retired.

Naphthalene Solutions in Benzol.—The "Technical Review," abstracting from foreign sources, says that tests carried out at the engineering laboratory of the Dresden Technical College, have shown that naphthalene solutions in benzol especially are very suitable for motor fuel. Not only is benzol above 10° C., and even at lower temperatures, able to keep large quantities of naphthalene dissolved (30 parts by weight of naphthalene are dissolved at 0° C. and 21 parts at −10° C. in 100 parts by weight of benzol), but naphthalene has also the property of retarding the freezing of benzol below 0° C. as long as the solution is not completely saturated. Thus a benzol, which ordinarily would freeze at −2° C., can be kept liquid down to −6° C. by adding ten parts of naphthalene, and even down to −10° C. by adding twenty parts.

Glasgow Housing and Health Exhibition.—At the Housing Exhibition now being held in Glasgow, promoted by the Corporation, the Gas Department has a good display of cookers, and also various methods of water heating, including a heater specially designed to fit over the kitchen sink. Many other kitchen facilities are being shown. Messrs. M'Dowall, Stevens, & Co. exhibit the "Jura" patent gas-circulator. It fits into any kitchen range fireplace, and sits close. Four burners radiate an even heat. This circulator provides a hot bath for 2½d. A fitting on the front of the fireplace provides for the heating of the room. Messrs. Smith & Gillespies, Ltd., of Bonnybridge, specialize in odourless gas-stoves, and show goods suitable for modern workmen's dwellings. Their "Chattan Premier" combines the qualities of a first-class cooker and a sitting-room fire; and their special hot-water system commends itself to builders. Messrs. Sharp & Co., of Glasgow, have a small scullery and bathroom supplied with hot water by a "Konocoil" gas-heated water circulator, fitted with light copper tube throughout, to supply hot water to bath, basin, and sinks. Gas mantles and their manufacture are on view by the Ramie Company and Messrs. Curtis's & Harvey, Ltd. The exhibit of the Richmond Gas Stove and Meter Company, Ltd., was referred to in the issue for Oct. 14 [p. 72].

MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

AUTUMN MEETING.

THERE was an attendance of forty-five members at the autumn meeting which was held at the Grand Hotel, Birmingham, last Thursday afternoon. The chair was occupied by the President, Mr. A. T. Harris, of Market Harborough. The nominations of officers for the ensuing year were presented and approved. There was afterwards an interesting discussion initiated by Dr. E. W. Smith, F.I.C., the Chief Chemist to the Birmingham Gas Department, on the Fuel Research Board's report on "Gas Standards;" and the interest of the meeting was further enhanced by a contribution on "Some Troubles with a Two-Lift Gasholder and How they were Overcome." This was made by Mr. G. Bernard Fiddes, the Assistant Engineer of the Leicester Gas Department, who was warmly congratulated on his contribution to the proceedings.

THE LATE MR. NORTH.

The HON. SECRETARY (Mr. W. G. S. Cranmer) having read the minutes of the previous meeting, they were confirmed. He announced the receipt of a letter of apology for absence from Mr. J. R. Duff, the Vice-President, on account of the death of his father.

The PRESIDENT said it was a matter for sincere regret that the circumstances necessitated reference to the death of an old and most esteemed member of the Association and one of the founders—Mr. William North. It was his privilege to have known Mr. North since 1884; and on all occasions he found him a sincere friend. The Association and the world at large were the poorer by his decease; and he asked the members to rise in their places as a mark of respect to one who was ever an ornament to the Association.

Those present accordingly did so.

The PRESIDENT moved a resolution of sympathy with the relatives of the late Mr. North, and also with Mr. Duff on the death of his father.

The HON. SECRETARY observed that perhaps, with one exception, he had known Mr. North for a longer period than anyone present. As a boy he knew him; for it was under him that he first commenced work in this country on returning from Australia. He always looked back to the time he spent at the Stourbridge Gas-Works with a considerable amount of pleasure; and for Mr. North he had the very greatest respect.

Mr. H. POOLEY (Leicester), in seconding the resolution, alluded to the cheery demeanour of Mr. North at the Association meetings. They all, he said, missed him very much after his retirement; and personally he had entertained the hope that Mr. North might occasionally come among them. The news of his death had been to him a very great shock.

The resolution was approved.

A NEW MEMBER.

Mr. E. T. Harrison, of the Lutterworth Gas-Works, was elected a member.

ELECTION OF OFFICERS.

The HON. SECRETARY stated that, as usual, there were no nominations from the general body of members, with the exception of the Vice-President as President.

The nominations were as follows:

President: Mr. J. R. Duff (Banbury).
Vice-President: Mr. James Paterson (Cheltenham).
Committee (to replace members retiring in rotation): Messrs. C. H. Carder (Oldbury), P. Dougall (Kidderminster), and F. Lee (Hinckley); and to replace Mr. Paterson, for his unexpired term of office, Mr. R. S. Ramsden (Leamington).
Auditors: Dr. E. W. Smith (Birmingham) and Mr. W. E. Caton (Oxford).
Hon. Treasurer: Mr. W. R. Cooper (Banbury).
Hon. Secretary: Mr. W. G. S. Cranmer (Willenhall)

The HON. SECRETARY mentioned that he had just received from Mr. Cooper a sympathetic letter in reference to the death of Mr. North.

The PRESIDENT, referring to the nominations, said they felt proud to have the name of Mr. Duff as President. The gentlemen whom it was proposed to place on the Committee had all done good work for the Association; and he believed all the names would meet with hearty approval. With regard to the Hon. Treasurer he would like to see the name of Mr. Cooper associated with the office indefinitely. They all appreciated the hard work he did at one time as Hon. Secretary and since as Treasurer, and he hoped as long as he lived he would remain with them in an official way. He thanked Mr. Cranmer for consenting to continue as Hon. Secretary.

The nominations were approved *en bloc*, on the motion of Mr. B. W. SMITH, seconded by Mr. VINCENT HUGHES.

REPORT ON GAS STANDARDS.

Dr. E. W. SMITH then opened the discussion on the Fuel Research Board's report on gas standards. The discussion was not, he said, as to what was the best quality of gas to turn out, but as to whether the Fuel Research Board's report was a good one, and whether they disagreed with the particular findings of Sir George Beilby. They ought to be thankful that they had a man like him to deal with the subject in such a comprehensive way, and who had seen fit not to put further restrictions on the gas industry but rather to make the whole question of gas standards and testing so flexible that every undertaking could adapt itself to its own particular highest efficiency. It was remarkable that a Government Department should have brought forth such a report. It ignored the whole question of the illuminating power standard. They had no need to fear this in Birmingham, as the large proportion of the gas was used for industrial purposes and heating; and they did not need to consider the question of the flat-flame burner. There was still a large bulk of their consumers who were using it for domestic purposes. To them, they said: "It is up to you to put in incandescent mantle burners." There were also in factories and workshops a large number of men who depended absolutely upon the flat-flame gas-burner for the illumination of their work. To these, they said: "We will fit you with a small carburettor on the services affected by this; and we will give you all you want." He thought that Sir George Beilby was wise in ignoring the question of the illuminating power standard. There was another restriction cut out in relation to water gas. They could not formerly supply more than 25 p.ct. of water gas—that was tacitly wiped-out; and they could supply if necessary 50 p.ct. or more, so long as they kept to the standard set up. As to gas sold on a heat-unit basis, he had not yet found out what was exactly in the mind of Sir George Beilby as to how it should be carried out. Personally, he had come to the conclusion as to what was the only practical way. It was proposed to sell gas on the heat-unit basis, and still measure by volume in ordinary meters. But each undertaking should specify for a limited period what calorific value should be taken as a minimum standard. By inference, it would indicate that it would pay for calorific values to drop. The tendency had been, in the discussions, to assume that the calorific value would drop if that were put into force. It was in his opinion all to the good that calorific value should drop below the values set previous to 1912 or earlier. It was not efficient to turn out gas of a calorific value of 600 B.Th.U. gross, as was the case before 1912.

Dr. Smith thought more care should be taken (and particularly by gas appliance makers) in their demands that calorific value should be the standard—that there should be a general standard of calorific value. It was now whittled-down to three or four standards, but not more. Every gas undertaking, if it could get to its highest efficiency, would probably have a different calorific value. Gas undertakings with horizontal retorts and nothing else would have a calorific value, when the highest efficiency was obtained, much higher than vertical retorts with or without steaming. He thought it might be assumed that it was not possible to have one standard of calorific value throughout the country. Another assumption made was that it would be possible, supposing a gas undertaking was allowed a certain price per B.Th.U. to be taken as a maximum price—just as now there was a maximum price per 1000 c.ft. of gas—that if the calorific value was reduced, it would be possible to sell gas at a corresponding reduction of price. If it did turn out to be so, it would be a matter which would be more good luck than good management. He meant that there was no automatic variation in the cost of producing gas, whether it was reduction or increase in calorific value. There were so many other things that came into consideration outside the retort-house.

There should be no prejudging as to what should be the proper quality of gas as a whole; nor for any particular type of installation. He did not know yet; and the situation changed so much with the markets—cost of coal, prices of residuals, and labour, and everything else; and as these factors only affected certain parts of the cost, it was likely to be that the main value of the report, in specifying the B.Th.U. basis, would be that they had the possibility of varying the calorific value, or varying their methods of dilution and production almost from month to month, in order to obtain the biggest return per ton of coal from their residuals and everything else. This, to his mind, was the greatest advantage that was going to be given them by the possibility of varying their conditions to secure the highest efficiency on their works. High efficiency was conducive to coal conservation and economy, and reduced cost of gas. In the selling price of gas, one-third went to management and distribution and fittings and to things outside the works. If this were so, there was a dead standing charge which would be independent of the cost of production on the works; and, therefore, the selling price would not vary to such a great extent as if they were selling direct off the works, or free on rail without being delivered. By inference, subject to getting the maximum B.Th.U. out of coal and coke, it would pay to produce their gas of the highest calorific value

because the distribution charges would be lower. This was so, within limits.

On the question of inerts, Dr. Smith said he had always felt that war conditions should not be taken into account in discussing it. It would be unfair to bring it in immediately if there were going to be any restriction of inerts; it should be so low as to be within reasonable limits of working, and so low as to protect the consumer. The only factor to be considered was the consumer. He must be considered at every point. He (the speaker) had no objection to turning out a gas with anything up to 30 p.ct. of inerts, subject to the fact that it should be constant at that, and not vary more than 3 or 4 p.ct. from 30 p.ct. It was difficult to guarantee that the gas should be reasonably constant at 30 p.ct. The chief advantage of low inerts was entirely a question of which method best secured constant service. This was primary. He felt that 15 p.ct. of inerts was the healthiest figure that could be proposed. He knew that 15 p.ct. of inerts could be worked to, subject to the use of blue water gas of a reasonably good quality —270 or 280 as a minimum. There was no difficulty then in working to 15 p.ct. of inerts. He thought 12 p.ct. was too low as an absolute limit. Inerts, as such, were no source of harm whatever to the consumer, if he were given constancy of inerts. What was harmful was any variation in the specific gravity of the gas. He was of opinion, if there was a maximum gravity specified, it would not only be simpler to check, but a truer indication of the effect on the consumer by the changes of gas quality, to have gravity stipulated rather than the percentage of inerts. Inerts did not matter so long as they were constant. He did not mean from the point of view of Prof. Bone or anyone who went into the question scientifically to get the last bit of value. He meant, under average practical conditions for the consumer, for furnace work, or for boiling water, &c. Within very wide limit indeed, up to 30 p.ct. of inerts were to his mind quite a secondary matter; and without prejudging the report of the Research Committee, which was now prepared, he thought he could say that inerts within very wide limits did not matter. The CO_2 did matter; but even that did not amonnt to a very wide figure. Its effect on the illuminating power of the gas was two-and-a-half times that of nitrogen; so the CO_2 must be watched.

Another point he would strongly urge, said Dr. Smith, was that gas engineers should not fear official testing. Very few undertakings had regular official testings of their gas; and they considered themselves fortunate. It was not good fortune, to his mind, not to have official testing—that was, if it were carried out properly and in a proper place. He would suggest that a system should be organized on a similar basis to the system that existed for the Alkali Inspectors—the country divided into areas covering a number of gas undertakings, with inspectors, and a Chief Inspector to take on the whole of the responsibility connected with the testing of gas. It would, he was sure, be a good thing for the industry. This did not mean that it should be left to the inspectors as to what they should do; their duties and responsibilities would have to be carefully laid down. Where there were possibilities of unreasonable variation, it ought to be more controlled—controlled not only for the consumers' good, but for the producers', and for the good of the country, in that it all meant higher efficiency and greater conservation of the natural resources of the country.

As to the Fuel Research Board's specification of 2 inches pressure, it was quite reasonable. It would not be practicable in most of the big towns to work to 5-10ths or anything like it. He agreed that 2 inches was a reasonable figure. He was afraid that most gas engineers were desirous that it should be lower; but they probably had special conditions.

The only other point he wished to make was in connection with the steaming of verticals and the mixtures of blue water gas. He had had some figures got out recently (in conjunction with Mr. Tomlinson, of the Nechells works) which showed conclusively that blue water gas on a B.Th.U. basis was more costly by 20 p.ct. than coal gas; and therefore where this did hold good, it did not pay except from the point of view of the conservation of coal, which for the time being was important. There might be districts where there was little sale for coke. Then it would be much cheaper to make blue water gas. It was claimed that with lower calorific value gases however brought about, by inerts or blue water gas, equally good results were obtained where the gas was of 400 or even up to 600 B.Th.U. From tests carried out on illuminating powers within these limits—400 to 550—the results obtainable with inverted and upright burners were practically identical, subject to the inerts not being higher than 30 p.ct. On careful practical tests within wide limits on varying mixtures of gas the results obtained were very close together on a B.Th.U. basis.

DISCUSSION.

Mr. GEORGE HELPS (Nuneaton) said in his view the whole question would be wisely directed to the one question of inerts, with which that of quality was bound-up inseparably. There should be no difference of opinion upon it. Questions of gravity or distribution were not the first things for consideration. They needed to get down to dead-practice. What did the consumer use? He used carburetted air; and he (Mr. Helps) could quite conceive that it would be wise to consider the distribution of air alone. If one considered what the consumer used, one was forced to a single conclusion—whether 600 or 300 B.Th.U. gas were sent out—what the consumer used was identical. If this was so, why should they discuss the quality of the gas at the nipple of the burner that the consumer used? He asserted that there was no earthly reason for the restriction of inerts, particularly when they sold gas in the only rational way—on the basis of heat units. The only rational reason there would be to restrict inerts would be that there were so many inerts in the gas that the consumer would not get the same efficiency from 100 B.Th.U. at his burner-head. The endeavour of the Board of Trade to restrict inerts was, he insisted, fatal to the progress of the gas industry. The whole trouble was brought about by certain persons posing to have knowledge that they did not possess. There were many men in high positions who ought to be hauled-down because they were false leaders.

Mr. H. POOLEY (Leicester) said it should be borne in mind that, if they distributed an inordinate amount of inerts, they materially increased distribution costs. He was aware of the difficulty of denuding coal gas of inerts, and knew that in some districts 30 to 40 p.ct. had been sent out. [A VOICE: No, sir.] He believed that he was correct. The question of the enrichment of coal gas by the addition of stripped gases was no new thing. He thought one effect of the report would be to cause them to give more careful study to the question of the inerts they put in the gas. The subject of pressures was most important. A 20-10ths minimum pressure was suggested. It was rather difficult to maintain this pressure at all times in a large system, and where there were old mains and the demand in a district had grown enormously. In all such cases, means must be taken to effect some improvement.

Mr. JAMES PATERSON (Cheltenham) took the view that there were points in the report which opened-up new vistas. It was apparent that in many places the distribution system would have to be modified. It seemed to him that the whole question of charge would depend upon the figure at which the units—80 or 100—would be charged-out. He had never yet heard any remarks as to the drop in calorific value or distribution. In his own case, he had taken steps to check the calorific value of his gas at the distribution station, and at the works; and he had found, on a number of tests, something like a 2 p ct. drop in calorific value. If they considered a hypothetical case, and he sent out 510 B.Th.U. at the works, he found that he got about 500 B.Th.U. in the town, which was about a mile away from the works. On the question of inerts, there were points from the purely logical aspect that caused difficulties. Dr. Smith did not mind 30 p.ct., and Mr. Helps did not apparently object to a much higher figure—50 p.ct. Then why stop there? [Mr. HELPS: Because you would then affect the consumer.] There was the danger of carrying the figures to too great a length. He emphasized the importance of checking the specific gravity by means of finding-out the proportion of inerts. He took great exception to testing pressures at the meter outlets. He believed 20-10ths was the pressure they guaranteed throughout their area—at any rate, it was the very minimum. He thought an amendment of the report might well be made, so as to allow the pressure to be taken at the outlet, or in the old place, on the main. Then he thought the difficulty might be overcome.

Mr. CRANMER (Willenhall) urged that underlying this question was that of self-interest. Some engineers had been in the habit of distributing gas up to 600 B.Th.U. When mains were only large enough to distribute gas of high quality, was it economical to get through such mains gas of 400 or 500 B.Th.U.? If they did, they might have to engage on a big scheme of main enlargement. Statements had been made that 300 B.Th.U. gas was equal to 500 or 600 B.Th.U. He did not agree with this, generally speaking. Flame temperature did not enter into the question in the case of the gas-cooker; it was heat units that were wanted. As to boiling burners, there might be a little difference, or in the case of incandescent burners it might hold good. With the 400 B.Th.U. gas, the specific gravity would be high, owing to the increased quantity of inerts, and to distribute such gas a higher pressure would be required. They needed a higher pressure with the higher quality gas because they needed a higher velocity at the burner nipple.

Mr. W. M. VALON (Stafford) said by Act of Parliament he was required to supply at a pressure of not less than 20-10ths in the day, and not less than 15-10ths at other times. By putting in a system of high-pressure feeders, they had been able to bring up the pressure. They worked to 35-10ths, and they did not get a variation of more than 2-10ths for the required period by having the system of feeders, fitted with Reynolds' governors. He thought members might disabuse their minds that to distribute a large extra volume of gas meant anything like a *pro rata* increase in cost of distribution. They could distribute 25 p.ct. extra gas by using the feeders, and their cost of distribution was not up to 3 p.ct., and that included the cost of gas-power. As to one B.Th.U. being as good as another, he was rather a believer in that, provided it was regarded from the logical conclusion, and looked at from the point of view of the B.Th.U. used at the burner-head.

The PRESIDENT hoped the Government would take steps to provide gas undertakings (and more especially small undertakings), with freedom to obtain coal supplies that would give a constancy of B.Th.U. With the present varied qualities of coal, it was absolutely impossible to maintain anything like a constant quality in B.Th.U. He trusted pressure would be brought to bear upon the authorities so that gas undertakings might be in a position to give their customers what they guaranteed to do. He could not conceive why they should send through their mains 50 p.ct. of inerts.

Dr. SMITH, replying to the discussion, appealed to Mr. Helps to give to Dr. Carpenter and others the credit for being imbued with as much good faith as he had, though they might be all ignorant, and might not have had so much experience. He agreed that there was a drop on distribution; but since they, in Birmingham, had gone to a lower quality, the drop was not so great. As to inerts, what he meant was that it did not matter to the consumer as to any variation up to 30 p.ct. But he thought it bad policy to put that out from the point of view of cost of distribution. Although they kept their own restrictive limit of 15 p.ct., he did not think there should be any restriction whatever of inerts so long as there were competent engineers to keep watch over what they were doing, and were all out for running their works at the highest efficiency. He had been able to obtain with all gas ranging from 500 B.Th.U. down to 300 B.Th.U. equal efficiencies without making tremendous alterations in the burners. If they could

obtain equal efficiencies with all these gases, it was better to distribute a higher grade gas than 300 B.Th.U.

Mr. HELPS suggested that it might be well to pass a resolution with regard to the question of inerts, because he thought they should fight against any restriction.

The PRESIDENT, however, expressed the view that at this juncture no useful purpose would be served by doing this.

Mr. G. BERNARD FIDDES (Leicester) then read the following paper:

SOME TROUBLES WITH A TWO-LIFT GASHOLDER AND HOW THEY WERE OVERCOME.

At the Aylestone Road works, Leicester, our No. 1 gasholder—a two-lift one, 170 ft. and 167 ft. 6 in. diameter respectively, by 35 ft. 6 in. deep, built by Messrs. Thomas Piggott & Co. in the year 1879—had, during the whole period of my being in charge (and, I am told, for years previously), caused much anxiety to those in authority, and discomfort to tenants in the gas cottages in the immediate vicinity, by blowing seriously at the lute for about half the circumference on each occasion when it uncupped—just before the outer lift was immersed in the water in the tank. A considerable quantity of gas escaped on each occasion, which (to say nothing of the loss) created a most objectionable odour, and consequent complaints from the tenants of the cottages.

Several attempts were made by adjusting the top rollers, to as far as possible level the cup, which always got out of the horizontal when disengaged from the grip of the outer lift when it grounded on the rest-stones. These attempts, however, were fruitless, and did little, if anything, to improve the condition. The holder continued this evil habit until the winter of 1909, when on the 16th of December (it was almost fully inflated) the gas escaped from the lute, and the holder rapidly fell, until the whole of the gas contained in the outer lift escaped, and the inner vessel sealed itself in the water of the tank. This was very disconcerting. About half-a-million cubic feet of gas escaped; and had the wind been in the direction of the retort-house, which is only about 30 yards away, the results might have been disastrous. Luckily this was not the case; and the holder did not bind in the guides at any period of its descent, which was most fortunate.

We were at the time unable to assign any reason for what happened, and therefore decided for the remainder of that winter to use it as a single-lift holder, not venturing to again try the experiment of cupping until special examination could be made of all the rollers, the columns plumbed, and (if necessary) the cast-iron guides examined. We experienced no further trouble during the winter; but it was quite disconcerting in a high wind to observe the manner in which the vessel rocked, which, when one watched it, gave the impression of being on a cross-channel steamer.

The following summer we placed the holder in the hands of Messrs. C. & W. Walker, Ltd., for a thorough overhaul. They commenced by plumbing the column guides, most of which were found to be sadly out of upright—the rollers binding on the guide face in some places, and being entirely clear of it in others. As I have before mentioned, these were of cast-iron, and were warped badly. It was therefore decided to replace the whole by steel channels, which, when completed, made a perfectly true path for the roller; and the top and middle roller carriages were adjusted to suit the new conditions. It was then thought to be desirable to inspect the setting of the carriages on the underside of the cup. To do this it was necessary to make a trip inside the holder when inflated; and, in order to obtain light, a few plates were removed from the crown, and a skylight fixed in their place. The man-lid over the inlet pipe was removed, and a small raft was built on the surface of the water in the tank and a rope-ladder lowered down the pipe. At the same time blowing apparatus was fixed, and an air-box and man-lid attached on the flange of the inlet pipe outside the tank. Entrance was made through the air-box, then down a rope-ladder previously fixed in the inlet pipe, crawling through the horizontal portion, then ascending the rope ladder of the stand pipe, and out on to the raft.

Messrs. Walker's foreman was the first to enter, but found the conditions inside so intolerable that he was forced to retire speedily, and reached the outer air almost in a state of asphyxia. Any further examination in this manner had therefore to be abandoned as unsafe. It was then considered how adjustment could be made. The probability was that most of the rollers were not set-up to touch the guides of the outer lift; and, being fixed under the cup, it was practically an impossibility to get at them without emptying the tank. This, however, could not be done without emptying a second tank of the same size in close proximity, without the danger of bursting the tank wall between the two holders, or one or both of the dumplings. Another expedient had therefore to be resorted to. This was to leave the existing rollers to their fate; fix new ones on the side of the cup plates; and adjust them so as to get close contact between the inner and outer vessels at each guide round the circumference.

To do this, and also to adjust the bottom rollers on the outer lift, it was decided to couple the two lifts together (with hooks and screws) when the inner lift was deflated; and then, when all the screws were in position, to inflate the inner lift. These two lifts would thereby rise simultaneously to the height of the inner lift. After inflation a few plates were removed from the outer vessel level with the inner lift cup, through which access was gained to the space between the two lifts. The water was syphoned-out of the cup; and it was only then that the reason for the fall of the holder was discovered.

One of the bolts securing a cup carriage had corroded so badly that the head had come off, or become small enough to fall through the bolt hole; and this had, in time, allowed the water to leak-away, with the result stated. The hole was plugged; the new rollers and carriages fixed; and the guides on the outer lift plumbed. After this it was the intention to carefully clean and prepare the cup for painting before lowering the vessels into the tank. But during the process of cleaning, it was found that what had looked like solid plate was, when scraped, nothing but denaturized iron and corrosion, and that most of the plates had been attacked along the bottom. Some of the corrosion was taken to the laboratory, and was found to be iron sulphide—doubtless due to spent oxide from an adjacent revivifying shed blowing in for years during high winds, and setting-up a chemical action where it rested on the bottom of the cup. No doubt, this was the agent responsible for the bolt falling from the carriage, and the cause of the whole trouble.

Upon close inspection, it was thought inadvisable to allow the plates to remain; and it was decided to have an entirely new cup—thereby making a thorough job of it once and for all. This could not be started upon, as it was approaching the fall of the year 1910. Storage capacity was necessary; and to fix the new plates meant emptying the tank of water, and also the tank adjoining (of which previous mention has been made). So it was necessary to leave it until the following spring. The holders were, therefore, lowered and uncoupled; and the inner lift was used again as a single-lift for the intervening period, as was done during the previous winter.

Before filling the holder with gas, it was advisable to remove the skylight in the crown, and replace the sheets. This in itself was only a simple operation; but it was not so in this instance, for although the window and all manholes were removed, the men could not stay inside long enough to fix the sheets. We tested it for safety with mice, and found them dead in the space of a few minutes. We attributed this to a mist-like vapour which filled the crown; and as the water which had been in the tank for years (although continually having fresh water supplied to the surface) was rich in cyanides, some of this may have been in suspension in the vapour, and probably accounted for the discomfort to the foreman, and his rapid exit when visiting the interior.

We ultimately cut a manhole in the sheeting, close-up to the spot where the sheeting was to be replaced. The men took a supply of air this way, working for only short periods, and taking an airing between; and, when they had completed, we fixed a manlid over the hole and went ahead. The emptying of the tank had then to have consideration. It was ultimately decided that it would be necessary to put the adjoining gasholder of the same capacity—viz., 1½ millions—out of action, and pump the water from both tanks simultaneously; care being exercised that the levels of water throughout the operation were kept equal, so that no pressure should be exerted on the division wall.

Then the matter of draining the ground in the vicinity had to be provided for, because as water is always encountered when the level of the river which flows by the works is reached, it was pretty certain that, unless this could be got rid of, the bottom of both tanks would be forced inwards as soon as the level of the tank water fell below that on the outside.

It became evident that some provision would have to be made to drain the land. After considering the pros and cons, it was decided to sink a well to a depth greater than the tank foundations. The method of sinking this well may have some novel features which are worth mention. It was to be 6 ft. internal diameter by 50 ft. deep, and composed of cast-iron lining plates bolted together in rings, each ring to be 5 ft. deep. The bottom ring was constructed with a knife-edge on the lower side, and internal flanges at the top and sides. All the other plates had internal flanges all round, with bolt-holes coinciding in all plates, and bracketed between each bolt-hole. Each plate had a number of slotted holes in the body of the plate, so that the surface water could gain easy access to the well at any depth. The holes were subsequently very useful for another purpose, not originally intended, of which I will say further later.

The first process after the site was fixed, which was at a point between the two holders, was to bolt together the bottom ring, knife-edge downwards, and when complete excavate the soil from the inside of the ring. It then slid by its own weight to the depth of the excavation—care being taken to keep it in a vertical position, until it had sunk deep enough to guide itself and follow on a vertical path. This was very successful for a considerable depth; and then the trouble began. The casing refused to slide any further, and defied all efforts to make it proceed in its downward journey. The cause was discussed, and the conclusion come to that the shell had followed too closely on the excavators—not allowing them time to clear a space of sufficient diameter to give clearance at the back of the plates—and that, in sliding on the face of the outside earth, it had got so wedged as to ultimately hold the shell in a vice-like grip.

We then decided to pass steel bars from side to side of the shell, by inserting them through the slots before mentioned in the ring of plates projecting above the well, and allow these bars to project sufficiently on the outside to get jacks underneath. By this means, we could hold the shell stationary for any desired period. The earth at the bottom of the excavation was well cut-away from the back of the plates; and by picking at the earth

with bars through the slotted holes, starting at the bottom and continuing upwards, the earth was gradually loosened, and falling to the bottom was sent up in the skips. We thus gradually effected a clearance for a considerable distance upwards. The jacks were lowered, and the shell proceeded on its downward journey in a very satisfactory manner. This method was resorted to, until the remainder of the structure was completed and successfully lowered to the desired depth without any further complications whatever.

The water was kept under by means of a Pulsometer pump, suspended in the excavation and lowered as necessary—longer delivery and steam pipes being added as required. We were by this means able to keep the water under; and we then proceeded to empty the gasholder tanks. When this was done we found, on inspecting the tank bottoms, that in places cracks had occurred through which water was gaining access like miniature fountains. But these ultimately subsided; and the weak places were finally caulked or grouted-in with cement. In order that if at any future time the tank may require emptying, it was thought advisable to fix back-pressure or safety valves in the tank bottoms. This was done by using a number of specially designed valves, each consisting of a sleeve-casting long enough to reach through the concrete and right through the puddle—the upper portion projecting slightly above the inside of the tank bottom. At the upper end a gun-metal seating and a gun-metal mushroom-valve working in a guide were provided—several being arranged equi-distant round each tank bottom.

Messrs. Walker were now able to proceed with the necessary repairs of adding the new cup-plates and fixing the cup-rollers, which was ultimately carried out in a very satisfactory manner. Ample opportunity was taken to examine every portion of both holders while the tanks were empty, and any little defects remedied; and I am happy to say that, up to the time of writing, no further trouble has been experienced. The well is covered with cast-iron plates, and remains ready for use if at any time necessary; and should we require a quantity of water in the vicinity for any purpose at any time, this would afford us an ample supply.

There may be some interesting points in connection with the carrying-out of the work which have, through the lapse of some ten years and the stress of war, escaped my memory, for which I express regret; but, in carefully surveying the various points, I am of the opinion that the principal difficulties have been presented to you.

DISCUSSION.

The PRESIDENT felt sure that the many practical hints which had been given in the paper would prove useful to those who might have to do similar work. He was in the position that at Market Harborough they had a considerable amount of water in the ground outside the tanks; and he was not sure that he would be able to effect his repairs without emptying them. He was sure that the hints given would be valuable, because such jobs at the best were difficult at all times to carry through. He congratulated Mr. Fiddes upon getting so well out of a difficult position.

Mr. H. POOLEY (Leicester) observed that the initial investigations referred to had been made before he went to Leicester; but the repairs generally took place in his time. The principal difficulty was in connection with the water in the tank. There he found that their fathers in the industry made the grave blunder of placing holders with brick tanks in too close proximity to one another. In the case of two gasholders, they stood within 30 ft. of each other. Later on they had two holders put down with a common column. The trouble came in because, when any repairs had to be done to one holder, they were compelled to throw both holders out of action. A great sacrifice of storage was thus involved. They hoped later on to put down a large holder, so as to compensate for the repair work that had had to be done.

Mr. P. N. LANGFORD (Coventry) said they had had the same difficulty of holders blowing. On investigation, they found on the inner lift that some of the rollers were missing. He believed the hints given in the paper would be of real assistance.

VOTES OF THANKS.

Mr. A. B. TOMLINSON (Nechells) moved a vote of thanks to Dr. Smith and to Mr. Fiddes. The latter's paper had, he said, brought vivid times to his memory of troubles experienced with gasholders. In 1897-8 he had to deal with the two large gasholders at Windsor Street, and fix the cup-rollers; and within the last four years at Nechells he had had to go into the large holder—the 8¾ million one. He thought all the gasholder people were much in the same boat as to troubles occurring. It was surprising the amount of corrosion that occurred in gasholder cups. Although three years ago the whole of the carriage bolts were renewed in the large gasholder at Nechells, this week he had had several leaking badly. They were all tightened-up, and lock-nuts were used and other special measures taken. What was the reason for the trouble? They often thought it was consequent on the added strain due to the flying lift. They were deeply grateful for Mr. Fiddes's paper, and they much appreciated too the address by Dr. Smith, with whom perfect fairness was a characteristic.

Mr. W. S. MORLAND (Gloucester) seconded the resolution. He stated that he had had no trouble of the kind mentioned. His tanks were down in the blue-lias clay, and were absolutely tight. Mr. Fiddes had dealt with the difficulty most ingeniously.

The resolution was unanimously approved, and the meeting then terminated—having lasted nearly three hours.

SOCIETY OF BRITISH GAS INDUSTRIES.

THE Autumn General Meeting was held last Thursday, at the Midland Grand Hotel, St. Pancras, N.W. The members assembled at one o'clock, and had luncheon, with the PRESIDENT (Sir Arthur Duckham, K.C.B.), in the chair. Very hearty welcome was given by the members to one of their Past-Presidents, Mr. Balfour Browne, K.C.

SOME SPEECHES AT THE LUNCHEON.

At the close of the luncheon, the loyal toast was honoured.

RECIPROCAL HONOURS.

Mr. SAMUEL CUTLER, Jun., Chairman of the Council, said he had a toast to propose which he was sure the members would receive most enthusiastically, when he said it was "The Health of their President, Sir Arthur Duckham." The part which Sir Arthur had taken in the conduct of the affairs of the nation during the most critical period of the war was one of which they were all justly proud. Their President had been honoured by His Majesty the King; and this honour was reflected on the gas industry as a whole, and on the Society in particular, as Sir Arthur was one of their members. One did not need to come into close contact with their President for more than a few moments to realize the force of the driving power and the energy possessed by him, and what was more the great store of knowledge that was behind his pleasant and captivating manner and expression. He was sure he was voicing the opinion of the members when he said they were very glad to have secured Sir Arthur as President for the coming year. He was, it was true, engaged in the same business pursuits as themselves. He was one of themselves; and in contradiction of the old saying that "a man hath not honour in his own country," they were very justly proud of him for both himself and for the great reputation he enjoyed among the highest-placed in the land. To give a practical instance of what he was saying, they were going to ask Sir Arthur Duckham to honour the Society by accepting the presidential chair again next year.

The toast was enthusiastically honoured.

THE GAS ENGINEER AND THE MANUFACTURER.

The PRESIDENT said he was all blushes, and without words. He did not think he had ever felt so uncomfortable as when Mr. Cutler was pouring out his long stream of nice things about him. He was proud to be there that day, and in the position he occupied, because, as the Chairman of Council had said, he was one of themselves; and they had done him the further honour of asking him to be President for a second year. This he accepted when he found there was not a dissentient voice. Though he appreciated the honour, the reason he was going on was in order that he might do some good for the great industry with which they were all connected. The gas industry was waking-up. The meetings that the British Commercial Gas Association had held during the past two days had shown the great possibilities for the future—how much they had on their side, how much more they had to do, and what great service they could render to the nation. They could only do this by coming together, and by pulling together. For instance, the makers of gas apparatus were asking how they could produce satisfactory appliances when the makers of gas supplied such beastly stuff. [Laughter.] The state of the country to-day was not the fault of the maker of gas. But this brought him back to his old topic, that they in the Society had to get closer to the manufacturer of gas than they were now. He was glad indeed the Society were going to read a paper before the Institution of Gas Engineers next June. This was a magnificent step; and he trusted the paper would be a red-letter one in their annals, and would promote a good discussion. He trusted that the paper would be one which would give the engineers not only a great deal of interest, but pleasure, and hope of assistance. Because he deplored, and honestly so, that the gas engineer was becoming every year less of a gas engineer, and more of a commercial man. The gas engineer had to rely upon the contractor; and so it was essential that he and the contractor should get together in the closest harmony, and jointly work out their designs. Where a gasholder was wanted, the design of some construction of holders was usually accepted; the same applied to washers, exhausters, and the other general plant of a gas-works. And more and more the retort-house was becoming the design of the contractor. It would be a great pity if the gas engineer lost his keenness of design; and so it would be better if they came together on this work. About their own work. They were in for troublous times. Take the section of retort builders. They had great trouble about the bricklayers' wages and the arrangements on which they could be got to work in the future. They did not know what was to come; and they had to face the situation. They must not go out singly, and make arrangements in their different works for different rates of pay, or for different hours or different bonuses. Other sections of the Society had had trouble with the founders, which might put a stop to all their industry, and the whole of the work the members of the Society were doing to-day. They as a Society should exercise their influence and weight to improve matters, or to get a satisfactory settlement. The Society it would be seen had great weight. If they looked at the aggregate turnover they had every year, it must be very big. They must bring the weight together in such a way as to influence the affairs of the industry and of the country. In settling the affairs of the bricklayers, the Society were not consulted. It was the

Master Builders' Society who did that. They ought to have some right to be represented in these great discussions on these grave questions; and they must look to the Chairman and the Executive Council to see to it. Any service he could render the Society, he would gladly undertake; and if in any way he could improve the Society, or the gas industry as a whole, he should be deeply thankful.

PAST-PRESIDENTS.

Mr. CYRIL DAVIS proposed the toast of "The Past-Presidents." He remarked that the Society had always shown in the past very good judgment in selecting the right men to fill the position of President. The Society had a list of Presidents second to no other society in the country; and he thought a good deal of the success achieved had been due to the fact that they were standing on a very solid rock—the rock provided by the Past-Presidents. They always found that not only did they take an active interest in the affairs of the Society while occupying the chief office, but they continued to show an amount of interest in the Society. If they required the advice or assistance of any of these gentlemen, they were always willing to give it to them. He saw in the newspapers the previous day that one of their Past-Presidents had just received a further honour. This was the Right Hon. Lord Justice Duke. He was made President of the Probate and Divorce Court. He coupled with the toast the name of a dear old friend and staunch supporter of the Society, Mr. Balfour Browne.

WRONG GOVERNMENT POLICY.

Mr. BALFOUR BROWNE, K.C., having thanked the members, said they were face to face to-day with the question of labour, to which the President had alluded. There were two or three questions to which he might refer connected with labour. The labour question was intimately connected with one that was raised the previous evening in connection with Government finance, which had been wrong from the beginning. When the war began, the Government ought to have made the country as far as possible pay for the war, and ought then to have made us poor. Instead of this, it attempted to make them—he was speaking as if he was a munition worker—rich by borrowing money and spending money with an absolutely lavish hand. It was this fact that had brought them face to face with the difficulty of labour; it was this fact that made them now hunt-down what were called profiteers, to take back from them the very profits the Government paid upon their bad work—10 p.ct. upon cost, which, of course, was an inducement to cost being greater. The Government's finance was not only bad, but their labour policy and their commercial policy were also bad. The Federation of British Industries had issued a very important document which everybody should see. It pointed out that the life of trade was to know where it was. As they knew, imports were protected; and they were protected only by the war, by the very fact that they were at enmity with various nations. The Government did this without consulting trade at all; and one of the objects of the Society had been from the beginning that trade should should be consulted. Without consulting trade, the Government swept that all away, and left all protected industries at the mercy of their policy. They were told by the Prime Minister that they were protected by high freights and by the exchanges; and they were going now to protect them further by an Anti-Dumping Bill. High freights would not protect industry; nor would exchange do them any good with France. As to anti-dumping, they said Germany should not sell goods here at a lower rate than in Germany. What was the good of this when they had wages inflated by 12½ p.ct. and by other means, seeing that Germany could undersell this country by reason of cheaper production? He thanked the members very much for the way they had spoken of the Past-Presidents. He thought they had set a fine example by continuing Sir Arthur Duckham in the chair for another year. He complained of certain of the Past-Presidents. When some of them had passed the chair, they to an extent forgot the gas industry. He had not done so. He was proud to be their guest that day. He was proud to have belonged to the Society as its President; and he thanked the members for remembering him on this occasion.

THE BUSINESS MEETING.

The Business Meeting was then held—Sir ARTHUR DUCKHAM presiding.

LETTERS OF APOLOGY.

The SECRETARY (Mr. Arthur L. Griffith) announced the receipt of letters of apology from Sir Dugald Clerk, K.B.E., F.R.S., Sir Alfred Keogh, G.C.B., G.C.V.O., Lord Justice Duke, Professor Smithells, F.R.S., Professor Harold B. Dixon, Lord Moulton, K.C.B., G.B.E., F.R.S., &c.

REPORT ON THE WORK OF THE SOCIETY—THE QUESTION OF LIMITING THE NUMBER OF SECTIONS.

Mr. SAMUEL CUTLER (Chairman of Council) presented the following account of the work of the Society during the past six months:

The occasion upon which we meet to-day marks the first general meeting of the Society since the victorious conclusion of the war. The human suffering, loss of life, and ruthless destruction, and all the horrors associated with war are, we devoutly acknowledge, things of the past. We have trodden a long and tortuous path during the years of this war; but the full measure of our rejoicings should be deferred until we have achieved, among ourselves, a just and lasting and industrial peace, and are able to say with all truthful meaning: "On earth, Peace and Goodwill to all men."

RETORT SECTION.

We have a number of subjects to discuss this afternoon, so I will at once proceed, and put before you some of the more important matters which the Council have dealt with during the first half of the present session; and, in the first instance, I shall give you the reports the Chairmen of sections have made to me on matters which expressly concern their sections.

Mr. C. F. Bennett, Chairman of Section No. 1 (Retort-Setters) refers to the following matters: Discussions have taken place on the question of wages, and lodging allowances for retort-setters and furnace builders, when it was resolved that the time was opportune for fixing a general standard rate, out-allowance, working hours per diem, and total for the week, travelling time, and employment of apprentices. Subsequently, it was found that the difference existing among trade unions in the several districts was so great, that it had been impossible to arrive at a fixed standard of hours.

A conference took place on Sept. 19 between a Committee of the National Gas Council (Federation of Gas Employers), when the questions of dirty money and extra pay for firebrick work over common brickwork were discussed; and later, at a subsequent meeting of the section, it was agreed that certain concessions be offered over and above the district rates for bricklayers for building firebrick work, providing satisfactory arrangements be made with the Unions as to overtime, working hours, and conditions.

I should like to say, although these matters only concern the retort-setting section, that the general principle of combating the never-ending demands on the part of the labour unions are instructive to all other sections.

PAPER FOR THE NEXT INSTITUTION MEETING.

The section have agreed to prepare a paper, entitled "Carbonization," which the Institution of Gas Engineers have invited the Society to give at their annual meeting next year. Let me add that the object of the paper is to present to the gas industry a complete thesis on "Modern Methods of Carbonization." It will be compiled on the basis of a joint contribution of all firms connected with the Society whose reputed business is the construction, erection, and putting to work of retort-house installations and machinery for charging coal and discharging coke. The subject of carbonization was chosen—it being felt that it was a fitting commencement in the sequence of apparatus employed in gas production. Needless to say, with our President as a co-contributor, the reputation of the Society can be safely left in the hands of Section No. 1 to produce a paper of the highest order. A Committee has been appointed to draw-up the rules governing the preparation of the paper, which will shortly be communicated to the firms interested.

GAS-METER SECTION.

Mr. F. G. Cockey, Chairman of Section 5 (Gas Meters), communicates the following:

Housing Scheme.—The position of the gas-meter industry in relation to the Government housing scheme has been discussed upon several occasions; and it was considered very important to this section that every means should be used to ensure that the claims of gas were not lost sight of. This section was represented at several interviews on the subject. It eventually appeared that the "B.C.G.A." had done all that could possibly be done to put forward the interests of the gas industry as a whole, and that no good would be served by the section taking independent action.

Life of Meters Committee—Standard Form of Guarantee.—During the past year, the new standard form of guarantee for gas-meters, more suited to present conditions, which was drawn up by this Committee, has been agreed to, and adopted by the National Gas Council, and was circulated among the gas undertakings of the United Kingdom in April, 1919.

New Standard List of Sizes of Gas-Meters.—The question of the rating of gas-meters has also been under discussion, and a revised list of sizes and capacities has been drawn-up and approved by the Institution of Gas Engineers. This will shortly be published, and will take the place of the present standard list, with a strong recommendation from the Institution of Gas Engineers that the rates for each size of meter should not be exceeded. It is hoped that this will come into force in the new year.

Progress of Investigations.—The research work in connection with this inquiry is being steadily carried on; and a very interesting and instructive interim report has been presented by Mr. Taplay, the Chemist to the Committee, on the result of his examination of deposits found in main and service pipes. This may be considered somewhat out of the scope of a Committee inquiring into matters affecting the life of meters; but it has proved most useful in confirming the conclusions arrived at by both Dr. Lessing and Mr. Taplay in previous reports—viz, that cyanogen compounds are responsible for a large proportion of meter troubles. This will appear in due course in the reports of the work of the Committee for presentation at the next annual meeting of the Institution of Gas Engineers.

It is felt that the work of this Committee has already indicated the directions in which relief may be sought from the destructive action of present-day gas on meters and other apparatus; and, as the work proceeds further, valuable information will be obtained.

GAS-STOVE SECTION.

Mr. H. James Yates, F.C.S., the Chairman of Section No. 6 (Gas-Stoves) reports: The only matter which falls to be chronicled as specially affecting the interests of the Gas-Stove Section is the meeting which was held on July 29 last at the invitation of the National Gas Council, and at which a few members of the Society were present by invitation.

Expression was given to a feeling existing among certain gas authorities that the prices of gas stoves and meters were too high. It was pointed out by Mr. Cyril Davis, in reply, that no just reasons had been, or could be, put forward in defence of this view. He reminded those present that the gas-stove makers, for example, had on two previous occasions met the leading gas managers at their special request, and in both cases demonstrated, to the expressed satisfaction of those present, that the prices then being charged were fully warranted by costs. On one of these occasions, a leading firm of accountants was employed by the gas-stove makers to investigate their costs; and a member of that firm had reported to the meeting, which was quite satisfied that the case for the then ruling prices had been substantiated. Mr. Davis also pointed out that the increase in the price of pig iron is more than the entire cost of that material previous to the war. In

point of fact, the increase of cost at the present time is approaching three times the immediately pre-war figure.

GAS-FITTINGS, ETC., SECTION.

Mr. F. G. Gould, Chairman of Section No. 7 (Gas Fittings, Burners, Governors, and Scientific Apparatus) states in regard to the importation of glass, mantles, lamps, and burners, that certain proposals were made to the Board of Trade as a basis for legislation, having for their object the prevention of unfair trading by enemy countries. After some correspondence, the Council were invited to send a deputation to the Board of Trade on June 25. Mr. Ashley received the deputation, and the proposals were fully discussed. The suggestions made by the Council with regard to a percentage tariff to be imposed in the country of origin on all manufactured exports by enemy countries, was not considered to be practicable. But with regard to the importation of glass and mantles generally into this country, the Board of Trade informed the deputation that the Government had decided to look after these articles so far as British interests were concerned; and regarding burners and lamps (although the Department had not considered in the past the necessity of dealing with these items so far as enemy competition was concerned), they now definitely promised that these articles should be carefully considered. It was understood that, in dealing with this matter, the question of Japanese competition in burner production would also come within the discussion between the Department and the Government. It was also made very plain that the Government had legislated already for anti-dumping generally. The deputation, which consisted of Mr. A. P. Main, Mr. F. C. Tilley, and Mr. F. G. Gould, were very well received, and the interview, which lasted over an hour, was considered very satisfactory.

FIRE-CLAY GOODS.

Mr. J. Pearson Perry, Chairman of Section No. 10 (Fire-Clay Goods), writes: Members of Section 10 have, like many other manufacturers, found the changing-over from war work to ordinary business a much greater difficulty than was anticipated. One of the chief troubles was the shortage of empty wagons. This is having a serious effect on the trade generally; and it is felt that a strong case should be put to the Minister of Transport explaining the difficulties, as, unless some relief is afforded, the manufacturers will have to seriously consider a closing-down of their works.

Subscriptions are being paid towards the Refractory Materials Joint Committee; but the matter has been somewhat complicated by the Government asking the firebrick manufacturers of Great Britain to find £3000 per year for research work—the Government contributing a like amount.

Mr. Perry points out that the Refractory Section plays a very important part in many contractors' works.

TO WATCH LEGISLATION.

Mr. F. C. Tilley, the *ex-officio* member of the Council who undertook the work in connection with the appointment of Parliamentary Agents to the Society, reports that it is likely a number of gas companies will shortly have to apply to Parliament for additional powers, and may take the opportunity of endeavouring to obtain the rights to manufacture appliances in which the members of the Society are interested.

The matter was brought up at the July meeting of the Council, and further discussed at the September meeting, after which Mr. Tilley approached Messrs. Blyth, Dutton, Hartley, and Blyth, of Gresham House, E.C., who were asked to watch the Acts promoted by gas authorities and report, when necessary, to the Council.

The Council discussed the matter at the September meeting, and in view of the importance to the Society that gas authorities should not obtain powers to enter into competition, or be in the position to threaten to start manufacture, it was unanimously decided to proceed with the matter; and the Solicitors have accordingly been instructed.

OTHER SECTIONS.

I have also received communications from Mr. T. V. Miles, Chairman of Section No. 2, Mr. West of Section No. 3, Mr. Milbourne of Section No. 4, Mr. Clark of Section No. 11, and Mr. Scott, Chairman of No. 12, all of whom report generally that the activities of their sections in the matter of holding meetings have been somewhat curtailed owing to the war and the subsequent transition period, and so they have nothing of general interest to report.

SUGGESTED REDUCTION OF THE NUMBER OF SECTIONS.

These, gentlemen, are the sectional reports; and in continuation thereof I should like to take the opportunity of putting before you a matter to which I have given some attention since I have had the honour of acting as your Chairman—viz., a desire to find a way by which the good and useful work the Society has done in the past can still further be augmented in the future.

Let me say at once it is far from my desire to depreciate in any sense the good, useful, and important work of those who have directed the affairs of the Society in the past. The growth, financial position, and important standing which the Society has attained among organizations associated with the gas industry, and last but not least, the complete harmony which prevails in all its proceedings, answer any criticisms which might otherwise possibly be construed from my proposing some slight modifications in the constitution of the Society. We embrace the whole trade connected with the industry; and several allied important industrial concerns are associated with us. Thus we require an organization which can deal with matters effectively and directly they arise, whether they be commercial, technical, or financial.

Now I want you for a few moments to refer to the Membership Chart to be found in the printed address I am reading a little later [copies of the chart were distributed at the meeting], and to consider two features of the present sectional divisions—viz., the disparity of numbers in relation to the various sections and the overlapping of membership, and to consider if some improvement can be made.

My view is to re-group and consolidate the sections, in order to make each a powerful and full representation of the particular trade it carries on for the gas industry, and that each section should only include those firms who are actual manufacturers of the apparatus designated by the section, and whose activities in these directions are an important part of their business. The sectional numbers have not been placed in numerical order, which, in effect, gives an indication how their neighbouring groups could be attached with some advantage, and further, for the sake of brevity, I have described the firms with the shortest of nomenclature.

The greatest overlapping occurs in the four sections Nos. 2, 3, 4, and 12, having a total membership of only 29 members, whereas the Meters Section alone counts 25, and the Gas-Stove Section 16, with but 4 repetitions borrowed from the meter manufacturers. The Retort Setters Section totals 19, and the Fire Clay Goods Suppliers Section 13, with two overlaps from the retort-setters. No. 7 Section musters 28, with, however, ten borrowed from other neighbouring sections. Sections Nos. 9 and 11 have a very small membership; whereas No. 8 ought really to be more defined, though it contains large firms of high standing and influence allied to the gas industry.

As a practical suggestion which I submit for your consideration, I would reduce the number of sections to six (or seven at the most), to consist of the following main groups:

	Comprising Sections Nos.	New Membership.
1. Constructional engineering contractors	2, 3, 4, 12, 9, 11	.. 36
2. Retort-setters and suppliers of fire-clay goods	1, 10	.. 30
3. Gas-meter manufacturers . .	5	.. 25
4. Gas-stove manufacturers . .	6	.. 16
5. Gas burners and fittings and scientific apparatus	7	.. 28
6. Suppliers of goods and materials delivered only, but not erected or fixed—such as pipes, tubes, paints, coals, &c.	8	.. 18

The membership is further subject to equalization by a revision of the somewhat elastic rule permitting all firms to belong to as many sections as they like.

I would suggest—in order not to reduce the General Council—that each section returns two members. A Chairman and Vice-Chairman of the Society with elective and *ex-officio* members would bring the Council up to its present strength.

There has always prevailed a complaint that it is difficult to arrange sectional meetings. Now would not augmenting the individual membership, with a reduction of the groups, meet the difficulty to a great extent. I am quite aware that problems will arise when we come down to the actual re-grouping, from the point of view of scheduling together, for example, firms who are suppliers of material only with actual contractors for installations. But there is no reason at all why sub-sections should not be formed that would, however, be responsible to their main section and the main section to the General Council. For instance, the retort-setters and suppliers of fire-clay goods can have their sub-section 2A and 2B. The constructional engineering contractors can have the gasholder makers as 1A, and the conveying plant and labour-saving machinery firms 1B, and so on.

I think I have devoted as much time to the subject as we can spare to-day. But this is an opportunity, all being together, to introduce it as a matter which concerns everybody; and if you will take away the chart with you, and think it over and communicate your views to your Sectional Chairman, we shall, no doubt, arrive at some consensus of opinion as to whether or not an alteration is desirable either now or in the near future.

EMPLOYERS' LIABILITY INSURANCE.

The Council have considered the question of employers' liability insurance, the premiums of which have very much increased, owing to the advance in wages, while the benefits have not been consistent in anything like the same proportion.

During the war, matters have remained fairly constant, and no doubt large profits have been made by insurance companies, resulting in them now offering lower terms, with a participation in profits on the same lines as the Iron Trades Insurance Corporation. I believe that a Commission are now sitting, on which the labour party is fully represented, and who are asking for increased rates in the scale of compensation both for partial and permanent disablement, also in the case of death.

It is also, I understand, the intention of the Government sooner or later to take over the Employers' Liability Insurance which follows a method adopted in Germany, Holland, and Italy, and which is worked out on the basis of cost. Thus we ought to be able to look forward to rates based more or less on cost without profit.

ANNUAL SPRING MEETING.

A suggestion has been made to hold a conference on the occasion of our next general meeting extending over a couple of days or so, and to take place at a convenient centre—say, Birmingham, Sheffield, Manchester, or Liverpool. The President's address, and one or two papers might be read, and probably a visit be paid to some important local engineering establishment. Sectional meetings could be held, and the two golf competitions played off for the "Yates" and "Thornton" challenge cups.

FEDERATION OF BRITISH INDUSTRIES.

We have very seriously considered the question of the Society becoming members of the Federation of British Industries. We have hesitated a little, because, as you know, subscriptions mean a no inconsiderable sum. But I understand the rates of subscription are being revised to some extent by the Federation. I think I may state they will be revised to the members of the Society if the Society itself belongs to the Federation. This is a matter we should seriously consider, because we think the Federation is one we ought to support.

SUBSCRIPTIONS TO THE "B.C.G.A."

The PRESIDENT next announced that Mr. Goodenough desired to address the members on a matter affecting the relations of the Society with the British Commercial Gas Association.

Mr. F. W. GOODENOUGH, Chairman of the Executive Committee of the British Commercial Gas Association, said he was not there to ask or plead for support for a charitable institution, or to ask the members

to give money for something from which there was no benefit. He was there to tell them something of what had been done, was being done, and could be done for their advantage; and to ask the members of the Society to invest money for their own benefit. He stood there representing a Company which subscribed about £3500 a year to the work of the Association; so that he was not speaking as representing those who did not firmly believe in the cause he was advocating. He occupied an entirely honorary position in the Association; so he could speak without any personal interest in the matter. As Chairman of the Executive of the Association—and he spoke for the Executive in this matter—he must say they were seriously concerned at the reduction which had taken place in recent years in the support the Association now obtained from the Society. He had always hoped—he had strongly hoped—as the work of the Association developed and showed its results, the Society would be able to see its way to increase very substantially its financial support. The numerical and the financial support of gas undertakings had been steadily rising. But money was worth much less than before the war, as the members knew; so that the subscriptions that were received from the Society did not go so far in producing results as they used to do. He realized the disadvantages suffered by many of the firms represented there, owing to the difficulties of the war; but the difficulties were almost as great, if not as great for the time being, as those that operated during the war. But, as Sir Arthur Duckham said at the luncheon, the Society represented firms of great weight, and having a large turnover; and he did not feel, therefore, he was asking anything unreasonable in urging support commensurate with the Society's own importance to an Association that worked for its benefit. What did the "B.C.G.A." do that was of advantage to the members of the Society of British Gas Industries? Lord Moulton said, at the conference over which he had been presiding the previous two days, that one of their principal activities consisted in making known the truth as to the "thousand and one" advantages of gas to the public. Before the Association started its work, the public were signally and singularly ignorant of the truth; and the public had many misrepresentations put before them. To-day there was much to be done to get falsehoods corrected, and the truth made known far and wide. The Association acted as commercial traveller-in-chief for the gas industry, and as its advertising agents. Another branch of work which he was sure would commend itself, and which was of great importance to the industry, was what they did steadily in advocating and making easier improved service to the public throughout the industry, that was, in the modernizing of methods and men in dealing with the British public who were the industry's customers, and who could be its customers to a much greater extent than they were at the present day, if only they made it possible for the Executive to see that the work of propaganda was carried on thoroughly. Propaganda work did not take the form of advertising only, but educational work began with those who created and guided public opinion—particularly the architects, doctors, teachers, and so on; and at the present moment the work they had done among architects was bearing enormously good fruit, and was destined to do so in the near future to a very great extent. This would be of immense importance during the next few years with housing schemes coming up for consideration everywhere. The conference held the previous two days had had a remarkable effect in arousing interest among architects. They had already had a number of most interesting inquiries. The post-bag at the office had been extremely interesting; and the money spent on the conference was coming back to the industry many fold. As a result of Tuesday afternoon's meeting, a man asked his Company to send to his house in the West-end, and put in gas fires from top to bottom. This was only typical of what was going on all the time. The gas managers up and down the country recognized what the "B.C.G.A." were doing for their side. He proceeded to read a letter from Col. Harold Woodall, of Bournemouth—a very good friend of the President—in which he expressed high appreciation of the invaluable work done by the Association. In the letter the very interesting fact was also mentioned that out of 27,428 houses in the Bournemouth Company's area of supply, 27,416 were supplied with gas services and meters. The cessation of gas supply, Col. Woodall truly remarked, would be the most serious calamity the country could suffer. Another source of congratulation appeared to the writer of the letter to be the general acceptance of the fact that gas-works were the proper places for coal to be carbonized for heating purposes, and not burned at the electric supply stations. This was typical of the feeling among gas managers as to the results the work of the Association was achieving for the industry. Was this work still necessary? It was more necessary than ever. They had huge electric schemes before Parliament at the present time. They had the compliment paid them from the opposition of having an Electricity Development Association started, to try to counteract the work of the Association. Something like a million houses were going to be built—at least they were talking about it. But anyway, they had to be built during the next few years. There was thus an opportunity before the industry quite unprecedented, of which they must take the fullest possible advantage, or write themselves down as incompetent business men. They might say this was all to the benefit of the gas suppliers. What benefited the gas suppliers benefited the makers of gas plant and appliances. Some might say it only benefited the manufacturers who produced gas-consuming appliances. He certainly believed that many thousand more appliances would be installed in years to come. But how was the gas to be supplied to these appliances if there were no additional retorts built, if there were no additions to the exhausting, condensing, washing, and purifying plant, if there was no addition to the storage capacity of the works, and no additional mains laid? Glasgow was about to spend some £600,000 on works' development. If the propaganda work of the Association, backed-up by the propaganda work of the gas undertaking locally (to some extent he hoped stimulated by the work of the Association), had not been carried on during the last eight or nine years, would Glasgow have required such an extension of plant as they needed to-day? Would so many other gas undertakings of the country be considering schemes for the development of their works to-day? He said, without hesitation, "No." He was sure the members of the Society did not want to reap where they had not sown. The work of the Association would, as in the past, bear good fruit, and would benefit every section of the Society. They could not say that any one section was going to benefit more than another. What made for the development of the gas industry made for the development of all the firms constituting the Society. The Society used to give the Association nearly £2500; they gave considerably less now. The £2500 ought to-day to be £5000 to be of equivalent value. A Society (to again quote Sir Arthur's words) having great weight and an enormous aggregate turnover, could surely put up £5000 a year towards the development of the business upon which its members depended for their prosperity, in so far as they were connected with the operations of the gas industry. Frankly, he was surprised it should be necessary for him to have to advocate the cause of the Association to the level-headed business men he saw before him. The results of the work of the Association had been obvious all over the country. It was acknowledged all over the country by the steady renewal and increase of subscriptions by the gas undertakings themselves. They did not subscribe £20,000 a year without being sure they got good value from it. A substantial sum came from across the Border, and from Lancashire and Yorkshire—quarters in which they prided themselves that they did not part with "brass" unless they knew they were going to get something for it. It ought not to be necessary for him to come as a missionary among the members of the Society, to ask support for an Association working as much for the benefit of the makers of plant and appliances as for the benefit of the gas suppliers. He thanked the President for the opportunity of saying what he had said. If any of the members wanted more information as to the work of the Association, he should, if they would let him know, be happy to send it. When they learnt all about the work of the Association the only trouble, he was sure, would be for No. 47, Victoria Street to get the receipts written for the cheques which would flow in.

The PRESIDENT said they were obliged to Mr. Goodenough for what he had told them as to the work and needs of the "B.C.G.A." Few of them required much telling. Those of them who had seen the most successful meetings of the Association of the previous two days would appreciate the splendid move that was being made and kept up by Mr. Goodenough and those who were associated with him. He had put the case strongly and fairly. They were all interested in the development of the industry; and he was sure the members generally would like to help. He thought it was a case for the sections to get together, and discuss these things, and see what could be done in each section to increase the help they were giving to the Association. The stronger they could make their position in the Association, the better it would be for the Society.

TRADING WITH THE CENTRAL POWERS.

Mr. SAMUEL CUTLER, JUN., read a paper on "The Policy of Trading with the Central Powers." This, with a report of the discussion, will appear in an early issue of the "JOURNAL."

Tea was afterwards served; and a pleasant half hour was spent in social intercourse.

Central Gas Heating Plant in New York.

Mr. William T. Rasch, in the pages of the "Gas Age," gives particulars of a seventeen room house in New York City which has been been economically heated by a central plant using artificial gas as a fuel. In the autumn of 1917, the owner of the house called upon the Consolidated Gas Company of New York, and said he was willing to pay up to 150 p.ct. more for gas than his former coal heating bills, if he could obtain his heating with the maximum of cleanliness and with positive control. It was decided to instal a gas-fired central heating plant, to heat the seventeen rooms, several of which had not previously been provided with heat. Hot-water radiators were installed throughout; and two heat regulators were fitted—one in the living room, and the other on the hot-water outlet of the boiler. The regulator in the living-room was operated to maintain a temperature of 70° Fahr. during the day and 55° Fahr. at night time. This regulator so set serves to control the interior temperature throughout the entire building. In addition to this, the regulator on the hot-water outlet also serves to govern the interior temperature. The regulator is adjustable, and can easily be set to keep the water at any desired temperature. At the beginning of the season, 120° Fahr. water is carried in the system; and this is increased from time to time up to 180° Fahr. during the coldest periods, and is reduced as the outside temperature increases. In this way the water in the radiators can be carried at a temperature proportional to the outside temperature, which experience has shown is the most satisfactory way. It is believed that this system of control has had much to do with the economy of operation of the installation. Figures are given which it is claimed show that the statement that a residence may be economically and satisfactorily heated by a gas-fired central heating plant is not all an exaggerated one. In fact, this installation has been followed by many others.

Dr. E. W. Smith, Chief Chemist at the Birmingham Gas Department, was elected Chairman of the Birmingham and Midland Section of the Society of Chemical Industry; but owing to pressure of engagements, he finds himself unable to accept the position, and Mr. L. P. Wilson, of Coventry, has therefore been elected. Mr. J. C. Sheldon, of Birmingham, has been appointed representative and corresponding member of the section on the newly-formed Chemical Engineering Group. It is the intention of the section to co-operate closely and sympathetically with the group, who are very keen about developing its work. It has arranged for a conference to be held on April 22 next at the Birmingham University, on "Labour Saving Devices in Chemical Works" and a number of papers will then be read.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Are Our Gas-Appliance Makers Behind the Times?

SIR,—The article under the above heading in the editorial columns of the "JOURNAL" for Oct. 28 calls for some comment.

The points made appear to be these:

The gas industry has been "precipitated" into conditions where both gas and air regulating devices are very badly needed.

Many gas engineers are of opinion that makers of gas appliances are not yet fully alive to what is happening on the gas-producing side.

Makers of gas-using appliances cannot say that there has not been warning of great impending changes.

Therefore, there should not have been made this year a single piece of apparatus for consuming gas that was not provided with means of adjustment; and "no gas official should have bought apparatus that is incomplete in this regard."

The last half-sentence of the above summary seems to the writer to indicate the answer to the indictment in so far as it is directed against the gas-appliance maker. The latter has endeavoured for years past to provide the adjustments now demanded; but comparatively few gas officials have taken advantage of the opportunities offered to them. Only in gas-fires and in lighting apparatus is the use of such adjustments general, and that because—at any rate as far as modern gas-fires are concerned—they cannot be obtained without these refinements.

When one considers cookers, the case is different. Appliance makers have offered adjustments, but have almost invariably been met by the gas officials with a refusal—in some cases simply on account of the slight increase in price occasioned thereby. Surely the gas official responsible for selecting the appliance should have been more "fully alive to what is happening on the gas-producing side," and have provided against it by taking advantage of the makers' offer?

In a similar manner, one could show that the maker has generally been anxious to supply all other gas-heated appliances with adjustments. But it would not be fair to the gas official to place all the blame to his account, any more than (as the writer has shown) it would be to lay any of it on the maker. The unfortunate fact is that we have had many announcements of various possible gas policies; some engineers advocating the one extreme, and others (as eminent) advising various compromises between that extreme and its opposite. We have, however, had no authoritative decision by a responsible body of leaders of the industry as a whole, as to the definite goal towards which the industry should be making. Hence, when the present definite order is issued, you are able to say in your well-chosen phrase "the gas industry has been precipitated," &c.

Attempts to fix the blame in one quarter or another for the consequences of this lack of directing force will not help us. For the present, full and cordial co-operation between the maker and the gas official is needed, in order to deal with the situation as it affects the huge number of inadjustable appliances now in use. For the future, let us have a reasoned and authoritative gas policy conceived with the two-fold motive of conserving the country's coal supplies—that is, of utilizing the supplies to the highest economic advantage—and of serving the best interests of the gas industry. But above all, in coming to this policy, let the claims of a "standard gas" be carefully considered. By this, the writer (who has advocated it both in public and in private for a number of years) means gas for the whole of the country which shall have, *as nearly as possible*, standard composition and standard pressure. The greater includes the less; and standard composition would include the other desirable points of standard calorific value, standard specific gravity, &c.

As one interested in gas-appliance manufacture, the writer can definitely say that, while appliances can be produced to deal with gas of widely varying quality, yet it is evident that the fewer the complications necessary in the appliance, the better served is the cause of mass production, with consequent advantage to the consumer, gas undertaking, and appliance maker. He would again urge the serious consideration of a "standard gas" for the whole of the country. It matters little what this "standard gas" may be, provided it is "standard." The gas appliance maker can produce apparatus to utilize it efficiently for every purpose to which the use of gas is suited.

FLETCHER, RUSSELL, & CO., LTD.,
ARTHUR FORSHAW, M.Sc., Chief Chemist.

Warrington, Oct. 31, 1919.

Water Gas and Coal Conservation.

SIR,—In your report of the discussion on the paper by Mr. Moore, of Scunthorpe, at the meeting of the Eastern Counties Gas Managers' Association on Oct. 22, I note that you report me as stating "If they kept on adding water gas, they had to reduce the make of coal gas to keep the quality right; and there was a limit beyond which *it was not safe to go.*" Instead of the words "it was not safe to go," my remarks should read "it did not pay to go." To reduce your coal gas make per ton below a certain point for the sake of adding a high percentage of blue gas, cannot be an economical proposition; for the cost of the coal gas mounts up as the make per ton is reduced.

With your permission I should like to add a few remarks about the installation of water-gas plants in small works.

1.—*Size of Plant.*—A plant of small capacity may at first sight appear to be of ample size; but it should be borne in mind that the cost per 1000 c.ft. made must be higher with a small than with a larger plant. The operator can just as easily, and at the same cost for labour, make 10,000 c.ft. as 5000 c.ft. per hour.

2.—*Boiler Power.*—On a small works, the steam supply should, if possible, be taken from the general works boiler; for to raise steam specially in a separate boiler, necessitating the use of extra labour, will probably disappoint some managers who expect to make a very cheap gas. The plant should, of course, also be erected in the near neighbourhood of the boilers.

3.—*Coke Handling.*—Much labour, and probably machinery, can be saved if the water-gas plant is erected adjacent to the retort-house. The retort-house at Felixstowe is of the stage-floor type, and the charging floor of the water-gas plant is alongside, and at the same level; so that it is only necessary to wheel the coke direct from the retorts and tip it near the charging door of the generator a few yards away.

4.—*Storage.*—A relief holder of ample capacity for at least an eight-hour run of water-gas making is of great value, and helps economical working of the plant.

In conclusion, I would emphasize the wisdom of erecting a plant suitable for making blue or carburetted gas. When working keep the intervals between shifts as short as possible; and pay the greatest possible attention to the depth of the bed of fuel, the air-blast, the steam supply, and the percentage of CO_2. Fluctuations in the percentages mixed are inadvisable; but with a steady line on a chart from a recording calorimeter, your troubles will be few.

F. M. PATERNOSTER.

Felixstowe, Nov. 2, 1919.

Step-Grates.

SIR,—You mention in your "Editorial Notes" that the step-grate is rapidly establishing itself.

May I be permitted to point out that the greatest exponent of the step-grate is the "Dempster-Toogood" system of continuous vertical retorts, inasmuch as, having proved the merits of this grate in 1910, it has been *exclusively* used during the last 7½ years?

H. J. TOOGOOD.

Elland, Nov. 1, 1919.

Retort Charging.

SIR,—May I thank Mr. W. B. Leech for his letter in your columns [*ante*, p. 83], *re* "Retort Charging," which is exactly the type of information I wished to acquire, as I had never heard of the trial he mentions.

CHAS. E. WRIGHT.

Ipswich, Oct. 29, 1919.

An Advance in Gas-Fire Construction.

SIR,—With reference to the article with the above title, which appeared in the "JOURNAL" issue for Oct. 21, Dr. E. W. Smith wishes it to be stated that the exact wording of his report on the conclusion of the tests was as follows: "There is no appreciable difference in the variation of the humidities during the tests with either fire. The new fire heats the room up considerably quicker, and maintains approximately a 20 p.ct. greater temperature rise."

"LEMARO."

Oct. 27, 1919.

REGISTER OF PATENTS.

Gas-Lighters.—No. 124,200.

GUINN, S. E., of Kentucky, U.S.A.

No. 5255; March 3, 1919. Convention date, March 2, 1918.

This invention relates to gas-lighters designed primarily to be attached to the gas-supply pipe of gas-ranges, and adapted to be held in the hand to ignite a burner. The principal objects of the invention are the provision of means arranged to ignite the gas by simply tapping the device on the range or other convenient place, and means for simultaneously opening the gas-valve at the time the operator, by a movement of the hand, taps the igniter.

The claim made for the invention is: A gas-lighter comprising a gas-pipe, an elongated combustion chamber on one end of the gas-pipe (considerably larger in diameter than the pipe), a resilient friction element extending through the wall of the combustion chamber, and a resiliently mounted sparking element mounted in the wall of the combustion chamber and in engagement with the friction element. The friction element is so positioned that, when it is forced inwardly, it will generate a spark and will extend across the path of the flow of gas from the pipe and dissipate the gas between the element and the rear wall of the chamber. A handle is mounted on the pipe in the rear, and spaced from the combustion chamber; while a flexible pipe connected to the rear end of the pipe supplies gas to the pipe, whereby an operator can move the device within the range of the flexible pipe and, by tapping the friction element, cause the ignition of the gas.

Extracting and Purifying Thorium Compounds. No. 127,555.

LINDSAY LIGHT COMPANY and RYAN, L. W., of Chicago, U.S.A.

No. 6456; March 14, 1919. Convention date, May 29, 1918.

This invention relates more particularly to a method of treating thorium fluoride. It has been discovered, the patentees state, that thorium fluoride, either moist or dry, may be converted directly into a dry sulphate by treatment with concentrated sulphuric acid at an elevated temperature. In this reaction, the fluoride of thorium, together with the fluorides of rare earths, which will usually accompany the thorium in any commercial process, are directly converted to anhydrous sulphates; the hydrofluoric acid set free being volatilized.

In the practical application of the process to the winning of thorium compounds from monazite sand, the latter may first be decomposed by baking with sulphuric acid and leaching the resultant mass. The solution thus obtained, containing a very large proportion of impuri-

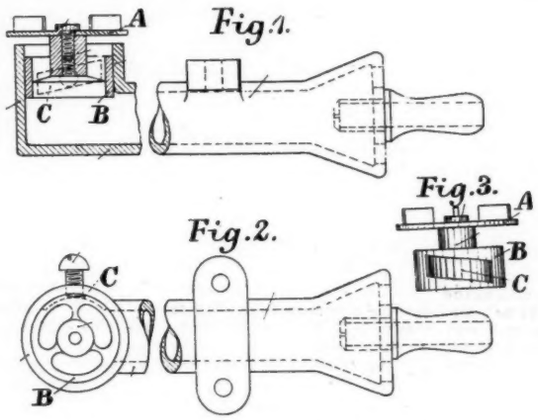
ties, is subjected to any desired steps to effect the gradual purification and concentration of the thorium—such as repeated crystallization of the sulphate or its repeated precipitation as hydroxide or fluoride solution, by means of sulphuric acid and crystallization. The solution from which it is preferred to precipitate the thorium fluoride is an acid solution—such as sulphate or chloride solution obtained during the purification process, and containing the thorium admixed with a small percentage of rare earths and substantially free from phosphatic compounds. A clear solution of this character is treated with hydrofluoric acid or a soluble fluoride in proper proportions to effect the precipitation of the thorium as a fluoride without bringing-down any substantial proportion of the rare earth metals present.

Atmospheric Gas-Burners.—No. 124,748.

NAAMLOOZE VENNOOTSCHAP WEST-FRISIA MAATSCHAPPIJ TER VERVAARDIGING VAN GASARTIEKELEN, of Noord-Holland.

No. 7190; March 22, 1919. Convention date, March 23, 1918.

This invention relates to a regulating device for the flame spreader of gas-burners—that is to say, the deflector or baffle for the gaseous mixture arranged above the open end of the burner mouth—and which spreader can be helically adjusted with regard to the body of the burner. It comprises a hollow cylindrical member connected with the flame spreader and fitting in the head of the burner. This cylindrical part is provided with a helical or oblique groove into which a screw engages after passing through the head of the burner. The screw not only serves as a guide during regulation, but also fixes the flame spreader in the desired position.



A Dutch Regulatable Atmospheric Gas-Burner.

Fig. 1 is an elevation partly in vertical section. Fig. 2 is a plan of the same burner with the flame spreader removed. Fig. 3 is a side view of the flame spreader with its connected cylindrical guide.

The head of the burner is closed at the upper side by the flame spreader A; while a hollow cylindrical guide B is connected with it. This guide is provided with a central boss having a screw-threaded hole to receive a screw to connect it to the flame spreader. The part B is, at its outer circumference, provided with a helical groove C, in which engages a screw fixed in the side of the head of the burner, and serving to guide the flame spreader with its accessories during the adjustment; while at the same time it fixes the spreader after it has reached the desired distance from the upper rim of the head of the burner.

Recovering Unoxidized Sulphur Dioxide in the Contact Manufacture of Sulphuric Acid.—No. 132,661.

BRITISH DYES, LTD., TURNER, J., and DAVIDSON, W. B., all of Huddersfield.

No. 17,869; Nov. 1, 1918.

This invention consists in uniting the gas exits of the several units of the contact-plant used in the manufacture of sulphuric acid into a common main, and leading the whole of the gases to gas washers or scrubbers, where they undergo a process of washing with a suitable solution or sludge—preferably comprising a solution of waste sodium sulphite obtained from the manufacture of synthetic phenol (or some similar processes), or alkalies such as carbonate of soda or milk of lime.

The resulting solution which leaves the gas washers or scrubbers is subsequently treated with acid—preferably with sulphuric acid or with hydrochloric acid which may be weak acid waste products—or substances containing sulphuric acid, such as nitre cake, heated to a suitable temperature by a closed steam-coil, and then agitated so as to effect the liberation of sulphur dioxide that is by that time quite free from dust and other impurities; the recovered sulphur dioxide being passed through a condenser to remove any excess of aqueous vapour, and then led into the gas stream passing to the contact chambers. The acids used for the purpose may be very weak acids, which would otherwise go to waste.

The patentees have found that from 70 to 80 p.ct. of the wasted sulphur dioxide in the burner gases can thus be saved, and the oxidation efficiency therefore increased from about 93 p.ct. (as at present) to about 98 p.ct.

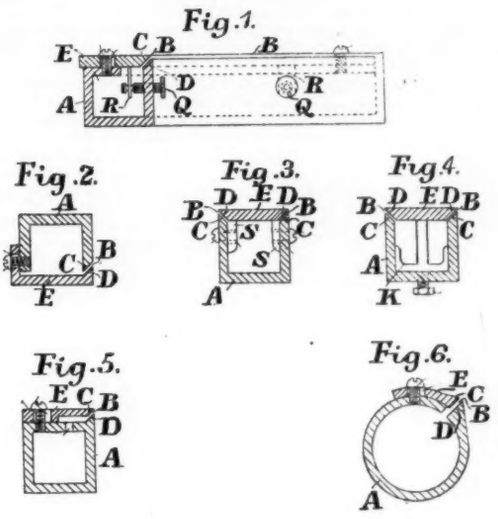
The acidity of the gases passing into the atmosphere through the common exit after washing is, by the process, reduced to less than one-third of what is usual, and comes within the amount allowed by the Alkali Act.

Bunsen Burners and Grillers.—No. 133,107.

HELPS, G., of Nuneaton.

No. 10,204; June 20, 1918.

This invention relates to bunsen burners having a gas-nipple and an air-inlet in proximity to it, and in which the size of the exit of the passage for the gaseous mixture can be adjusted so as to alter the quantity of primary air drawn in by the gas issuing from the nipple. Moreover, when the exit is adjusted to a suitable extent (depending on the quality of the gas, its pressure, and the length of the passages from which the gaseous mixture issues), the flame is coneless.



Helps's Bunsen Burner.

The burner tube consists of a trough having a longitudinal opening in it, a cover, and means for fixing the cover in different positions. Fig. 1 shows (part section and part elevation) a square trough-shaped burner tube with an adjustable cover. Here A is the burner tube; B the opening in it; and C and D the surfaces between which the admixture passes. E is the movable cover sliding over the portion of the trough which acts as a guide and secured to it by screw. Q is a screw actuated from the outside, over which fits a fork R attached to the cover, by means of which the slot orifice is regulated.

Fig. 2 shows another form of the burner. In this case, the so-called cover E is at the bottom—the trough A being uppermost; while the gaseous mixture issues through an opening formed by the surfaces C D.

Fig. 3 shows a trough-shaped burner tube having an orifice on each side. S are guides.

In fig. 4, the cover E is adjusted by the aid of a T-shaped guide K actuated by a screw. In lieu of the guide, a distance-piece may be used in the form of a hollow post through which a screw passes to the outside, and by increasing or decreasing the distance-piece the opening of the orifices is regulated.

Fig. 5 shows a square form of burner tube having a projecting edge forming one side of the slot. The cover E is recessed to form a chamber into which the admixture from the trough passes through an orifice before reaching the regulatable surfaces. A burner of this type may have more than one sliding adjustable cover—*i.e.*, there may be two openings and two orifices, and therefore the flame will issue from two sides of the trough.

Fig. 6 shows a round burner tube having a projecting edge. The cover in this case follows the curve of the burner tube, which is a round form of the burner shown in fig. 2.

Recovering Gaseous Products in the Destructive Distillation of Organic Materials.—No. 133,159.

BURY, E., OLLANDER, O., and BURY, A. F., of Saltburn-by-the-Sea.

No. 16,121; Oct. 4, 1918.

This invention relates to the selective separation of gaseous products, including vapours from the mixture of gases obtained by the destructive distillation of such materials as coal, shale, peat, oils, and ligneous substances. Attempts have been made, the patentees remark, to effect the separation of valuable gases and vapours from the distillation products of coking-ovens and so forth, by means of wood charcoal, which occludes certain of the gases whose separation is desired. The present applicants claim to have experimented successfully on a practical scale with wood charcoal for this purpose; but they have been faced with the difficulty of obtaining the necessary material owing to the high cost of timber for making charcoal, and the shortage of it. After some research, the applicants found that a material which may be regarded as "peat-coke," and which is prepared as hereafter explained, is a "very efficient substitute for wood charcoal as an occluding agent, while it can be obtained and manufactured at much lower cost, giving also certain valuable bye-products.

According to the invention, air-dried peat—such as can be obtained on the moors in many parts of the country—is taken to gas-works or coke-oven plant, where the separation of the gaseous products of distillation is to be carried out. The air-dried peat is distilled in a carbonizing plant of any usual type, by heating up to temperatures ranging from 700° to 900° C. The gases evolved are passed into the gas-

mains of the carbonizing plant, for the recovery of the ammonia and so forth. The residue in the carbonizing plant is a soft coke, which can be used without further treatment as an occluding agent. It is found to have an absorptive value for certain gases and vapours equal to that of charcoal, or even greater for a given weight of coke.

In the loose condition in which the peat-coke is produced, it will allow of the ready passage of the gas through it. Among the gases and vapours which the peat-coke will absorb are: Ethylene, benzene, propylene, toluene, xylene, sulphuretted hydrogen, carbon bisulphide, and organic sulphur compounds. Other heavy gases and vapours of a similar character can also be absorbed or occluded by the peat-coke from distillation products.

The peat-coke obtained as described is placed in vessels designed for the purpose, and preferably combined with scrubbers, which will prevent the carrying-away of the fine particles of the coke by the stream of gas. The vessels containing the coke are connected to the gas-mains of the principal carbonizing plant or other destructive distillation plant, and the gases are passed through these vessels and scrubbers at approximately normal temperatures and pressures. No decrease in temperature or increase in pressure is necessary with the peat-coke to secure the effective absorption of the gases.

When the peat-coke has been in use for some time for absorbing the heavy gases and vapours, it is removed through air-tight mains in order to avoid loss of the gases, and is brought into a heating vessel so that the heat applied may drive off the heavy gases and vapours. These are collected; and if they consist of mixed substances, the constituents may be separated, fractionally or otherwise, in the same or separate cooled receivers. The residual peat-coke, when the gases and vapours have been driven off from it, is allowed to cool out of contact with the atmosphere, and can then be returned to the absorption vessel for further use.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bill.

The Ammanford Gas Bill was read a second time and committed.

HOUSE OF COMMONS.

Coal Carbonized in Coke-Ovens.

Mr. ATKEY asked the President of the Board of Trade whether, in the amount of 183,000,000 tons available for home consumption in 1917, any account has been taken of the coals used in either the patent or beehive coke-ovens.

Mr. BRIDGEMAN replied that the coal used in coke-ovens was included in the estimate of 183,000,000 tons available for home consumption in 1917, under the heading of "Blast-Furnaces."

Mr. ATKEY asked how many tons were carbonized in 1917 and 1918 in the beehive and patent coke-ovens in the United Kingdom.

Mr. BRIDGEMAN replied that no statistics were available in the Coal Mines Department prior to the year 1919 of the number of tons of coal carbonized; but from information obtained from the Home Office reports, and from returns prepared by the Ministry of Munitions of the production of coke at coke-ovens, it was estimated that the coal consumption for this purpose was approximately 20,000,000 tons in each of the years 1917 and 1918.

Coal Supply for the St. Albans Gas-Works.

Colonel Sir H. CARLILE asked the President of the Board of Trade whether he could withdraw the Order issued by the Controller of the Coal Mines Department on July 11 last, substituting Northumberland and Durham for Yorkshire as the sources of supply of coal to be used at St. Albans for the production of gas; and whether he was aware that the results of this Order were that the cost per ton delivered at St. Albans was increased by 9s. 5d., and that it involved the substitution of a coal of inferior gas-making properties.

Sir AUCKLAND GEDDES replied that he understood that Durham and Northumberland coal was not at present being supplied to St. Albans. In view of restricted output in Yorkshire and the Midlands, however, it might be necessary in the future, as it had been in the past, to supplement supplies from these districts with Durham and Northumberland coal diverted from the export trade. He was aware of the facts referred to in the last part of the question; but he was informed that the Northumberland and Durham coal, when mixed with Yorkshire coal, could be used for gas-making.

Workmen's Compensation Increase.

The HOME SECRETARY (Mr. Shortt), replying to a question by Mr. Hartshorn, said a Bill to increase the amount of compensation payable under the Workmen's Compensation (War Addition) Act, 1917, was in preparation, and he hoped to introduce it very shortly.

Gas Apparatus Rental Increases and Profiteering.

Mr. LORDEN asked the President of the Board of Trede if his attention had been drawn to the action of certain gas companies in raising the rents for meters, stoves, and apparatus let on hire by 50 p.ct., even when such apparatus was installed prior to 1914; and, as local committees were in doubt how to act in these cases, would he take the necessary action to stop this profiteering.

Sir A. GEDDES said his attention had been called to the matters referred to. As the hire of a gas-meter or a gas-stove was not a sale or offer for sale of an article, he was advised that the Profiteering Act could not be applied to the rentals charged for the hire of such articles. They had been considering very carefully whether the Act required any amendment to extend the powers granted under it. This was at present under consideration.

MISCELLANEOUS NEWS.

LONDON COUNTY COUNCIL AND GAS SUPPLY.

At last Tuesday's meeting of the London County Council,

Mr. W. J. PINCOMBE asked the Chairman of the Public Control Committee the following questions:

(1) Whether the Committee are aware of the complaints as to the quality and quantity of gas supplied for lighting and heating purposes?
(2) What representations (if any) have been made to the gas companies on the subject?
(3) What are the powers of the Council, or other local authorities in London, to protect the interests of gas consumers in regard to these matters?

Sir GEORGE BETTESWORTH PIGGOTT referred to the report of the Public Control Committee submitted that day [see *ante*, p. 194], in which particulars were given of the action taken recently in consequence of complaints as to the quality of gas supplied in certain districts of London. As to the second question, he said the results of the regular testings made by the Council's gas examiners were reported simultaneously to the Metropolitan gas companies and the Council. They were thus kept continuously aware of the quality of the gas being supplied. Regarding question No. 3, he said that in the area of the three Metropolitan gas companies the Council alone have the power to test the gas, and to institute legal proceedings in respect of deficiencies below the statutory penalty standard, and to make representations to the Board of Trade—the paramount authority (apart from Parliament) in matters affecting the gas industry. Outside the area in question, however, the local authorities have similar powers to those possessed by the Council in respect of the Metropolitan area.

Mr. J. D. GILBERT, M.P., asked the Chairman of the Public Control Committee the following questions:

(1) Whether his attention has been called to the action of certain London gas companies in charging an increase of 50 p.ct. and more on the rent for gas stoves and meters, which in many cases have been in use by consumers for a number of years?
(2) Whether the Committee propose to take any action in the matter?
(3) If not, will he specially draw their attention to it, with a view to a report being brought up to the Council?

Sir GEORGE PIGGOTT: The answer to No. 1 is in the affirmative. In reply to questions 2 and 3, he said the matter would be considered by the Public Control Committee as on Friday last, and a report made to the Council in due course.

The report of the Public Control Committee (above referred to) was received without comment.

GAS COMPANIES' PROTECTION ASSOCIATION.

The Twenty-Second Annual General Meeting of the Association was held last Thursday, at Caxton Hall, Westminster, S.W. Mr. H. E. JONES, the Chairman of the Committee, presided.

The following attendances were noted in the register: Messrs. R. W. Edwards (Aldershot), W. F. Whittaker (Grays and Tilbury), R. Hall (Matlock, &c.), George Stevenson (Long Eaton), C. Cremer and A. Easton (Faversham), C. F. Botley (Hastings), George Andrews (Swansea), R. Bruce Anderson (City of Waterford), A. A. Johnston (Brentford), George Clarry (Cardiff), W. C. Lamb (Hampton Court), Stanley C. Sherrard (Kingston-on-Thames), H. Townsend (Wakefield), B. A. Comins, T. H. Hazell (Newport, Mon.), and C. M. D. Belton (Shrewsbury).

The SECRETARY (Mr. F. E. Cooper) read the minutes of the last general meeting, and of a special meeting; and they were confirmed.

The CHAIRMAN mentioned that Dr. Carpenter, Mr. D. H. Helps, and Mr. H. C. Head were unable to be present.

ANNUAL REPORT AND ACCOUNTS.

It was agreed that the report and accounts be taken as read. The report was as follows:

The Committee herewith present the revenue account and balance-sheet, together with a report of the proceedings of the Association for the year ended Sept. 30.

The ascertained expenditure amounted to £966 1s. 3d. The revenue was: Subscriptions and donations, £448 9s. 1d.; income-tax refunded, £36 15s.; interest on war loan, £195 1s. 6d.—amounting together to £680 5s. 7d., and leaving a deficit of £285 15s. 8d. From the balance-sheet it will be seen that the assets amount to £4433 6s., consisting of £4636 10s. 5d. 5 p.ct. War Loan, 1929-47, at cost, £4404 14s. 5d., balance at bank £25 10s., and cash in hand £3 1s. 7d. From this total must be deducted the amount owing to the bankers—namely, £2925—leaving a balance in favour of the Association of £1508 6s. Since the 30th of September last, the sum of £34 13s. has been received in respect of outstanding subscriptions.

The Committee have had under consideration the important question of income-tax allowances for renewals of plant. The matter was referred to a Sub-Committee, consisting of Mr. Botley, Mr. Hazell, and Mr. Iorns. The Sub-Committee held several meetings at which the question was carefully considered. In due course their report was presented to the Committee by whom it was received and adopted; and it was agreed that the Sub-Committee should be appointed a deputation to attend the Board of Inland Revenue on the matter. The Sub-Committee were received by Mr. Stanford London, C.B.E., the Deputy-Chief Inspector of Taxes, in March last; and as a result of the representation made to him, Mr. Stanford London stated that he would make the following recommendation to the Board of Inland Revenue:

That the allowances for depreciation to those gas companies who had agreed to the scheme of 1912-13 should be increased for the years 1918-19 and 1919-20 from 3 to 4½ p.ct. in respect of gasholders, and from 10 to 15 p.ct. in respect of meters and stoves.

That, as regards the financial year 1918-19, if income-tax had been paid before such recommendation was approved, the difference between the 3 p.ct. and 4½ p.ct. and 10 p.ct. and 15 p.ct. should not be recoverable by way of a return of income-tax overpaid, but should be allowed in the accounts for the year 1919-20.

However, the authorities have since refunded the difference in cases where claims have been sent in.

Notification was subsequently received that the recommendation had been approved by the Board of Inland Revenue, and that the Surveyors of Taxes had been instructed in accordance with such notification. The members of the Association were informed by circular of the recommendation; and an abstract of the scheme referred to was prepared by the Secretary and copies printed for the use of members.

The Chairman of the Sub-Committee and the Secretary had a further interview with Mr. Stanford London, with the object of securing that the increased allowance should be regarded as an additional allowance without affecting the written-down value of plant and appliances beyond the normal. But Mr. Stanford London stated that the Board of Inland Revenue would not agree to the suggestion.

The Committee, by circular letter sent to all members, called attention to the provisions of section 13 of the Finance Act, 1914, session 2, and subsequent Finance Acts, under which relief is given where there is a diminution of income, so that the profits of the year of assessment are less than the amount of the assessment.

The Committee have continued their correspondence with the Board of Inland Revenue with reference to the claim made by the Board to payment of loan capital duty on bank loans and temporary overdrafts granted by bankers to gas companies, which was referred to in the last report. As a result of such correspondence, the Committee, although unable to get the Board of Inland Revenue to lay down a principle upon which the question as to loan capital duty is or is not payable, were successful in securing from the Board a statement that, where loan capital duty is paid, the Board would transfer 2s. of the duty paid thereon "towards the duty attracted by the replacing debentures or debenture stock." The Committee regard this as a distinct concession, as when the correspondence between the Association and the Board of Inland Revenue commenced the Board contended that the time for dealing with this point would be when the debentures or debenture stock, out of which bank bonus and overdrafts were to be repaid, were issued.

The report to the Board of Trade of the Fuel Research Board on Gas Standards was considered by the Committee. A copy of the report was forwarded to each member of the Association, to whom was also addressed a circular letter requesting observations on various matters dealt with in the report—viz., (*a*) inerts, (*b*) pressure, (*c*) method of charging, (*d*) sulphur, and (*e*) effect on profits of making reduction in price proportionate to reduction of thermal units. The information obtained in response to this communication was collated by the Secretary, and proved of the greatest value to the Chairman of the Association, who represented the Association at a meeting held at the Board of Trade, for the purpose of considering the report of the Fuel Research Board.

The Electricity Supply Bill was considered by the Committee, and the Board of Trade were communicated with, with a view to the amendment of clause 15 (2). The Bill is still pending in Parliament.

The Committee made representations to the Board of Trade with reference to the necessity for further continuing the Gas-Works (Ministry of Munitions) Order, 1918, with the result that the Order was continued for a further period.

The Committee received and adopted, subject to certain amendments, the report of the Special Sub-Committee appointed by the Committee, to consider (*a*) the constitution of the Association, (*b*) the objects of the Association, and (*c*) the relations of the Association with and to other bodies, and generally such provisions as may be deemed desirable for adoption to bring the Association into line with the present and anticipated future requirements of the gas industry, particularly as affecting statutory and non-statutory undertakings owned by companies.

The new rules of the Association, suggested by the Sub-Committee, were agreed to by the Committee and submitted to a general meeting of the Association, held on March 20. At this meeting the new rules were received and adopted without amendment. A copy of the new rules was subsequently forwarded to each member of the Association.

In accordance with the provisions of rule 16, Dr. Carpenter was appointed Vice-Chairman of the Association and of the Committee, and an Executive Committee was also appointed consisting of the Chairman and Vice-Chairman, and Mr. Edwards, Mr. Botley, and Mr. Anderson.

The Committee, having given continuous consideration to the subject of the financial relief of gas companies, are pleased to state that the Board of Trade have now intimated their intention of introducing into Parliament, with as little delay as possible, a Bill relating to gas undertakings in the United Kingdom, based upon the recommendations contained in the recent report of the Fuel Research Board. In connection with the alteration in the basis of charging for gas recommended in this report, the Board propose to include in the Bill provisions for a revision of the existing standard and maximum prices. The Board state that they have also under consideration the introduction at an early date of a Bill to deal with certain difficulties which have arisen in consequence of statutory limitations in respect of the raising of capital required by gas and other public utility undertakings to enable the undertakings to carry out their obligations to the public. The Committee will carefully consider the Bills when introduced into Parliament, and take such action with reference thereto as may be necessary.

The following are the principal matters upon which the Secretary has been consulted during the year under review:

Disposal of effluent from gas-works. Unloading sulphuric acid from railway wagons—indemnity to railway company. Difficulties in obtaining coal. Payment of income tax on directors', &c. fees. Consumer supplying cover for meter. Money stolen from prepayment meter. Filing accounts with Clerk of the Peace. Gas-workers' wages—award of Committee on Production. Supplying electricity without statutory authority. Alteration of road levels by local authority. Application for licence or order to supply electricity. Price of gas for public lighting. Loans by bankers. Stamping receipts for wages paid. Raising money temporarily. Disqualification of aldermen and councillors of borough being shareholders or officials in a gas company from taking part in borough councils in discussion on matters connected with the borough's electricity department. Unemployment insurance. Mortgage of gas company's premises. Profit-sharing scheme. Borrowing powers—utilization of reserve funds. "Winchester clause." Applying Special Purposes Fund to Workmen's Compensation. Issuing gas stock below par. New cooker agreement. Compensation for subsidence. Cancellation of public lighting contract through war conditions. Special allowances to workmen. Employment of disabled ex-service men. Refunding by railway executive of additional coal carriage. Alteration of character of roadway.

The following members retire from the Committee in accordance with Rule 12: Mr. R. Bruce Anderson, Mr. C. D. M. Belton, Mr. G. H. S. Iorns, Mr. Hanbury Thomas, Mr. S. Y. Shoubridge, Mr. D. Milne Watson, all of whom offer themselves for re-election, with the exception of Mr. Hanbury Thomas, Mr. Shoubridge, and Mr. Milne Watson. There are four vacancies on the Committee, owing to the resignation of Mr. Hanbury Thomas, Mr. Shoubridge, Mr. Waddom, and Mr. Milne Watson.

FIGURES IN THE ACCOUNTS.

The CHAIRMAN, in moving that the report and accounts be received and adopted, said that, turning first to the accounts, the expenditure, as usual, was very simply stated. The Secretary's salary he had always thought rather moderate, seeing that it included the use of his own office, without any special payment, for committee meetings, which had now for some years been very frequent—almost weekly or fortnightly. This figure of 250 guineas was being looked into by the Committee; for they were all agreed that it was a very light payment—especially in these years when everyone's charges, even those of Parliamentary Agents, were all increased, in consideration of the enhanced cost of everything connected with living. Then there was a rather large item of £377, taxed costs of the Association in the matter of the Gas Undertakings (Statutory Prices) Select Committee, 1918. As to this, he might explain that they undertook the preparation of an important document—more enlightening, he believed, than anything issued by any other Association at the time—as to the effects of the increased cost of production, and the result on the dividends of both sliding-scale and maximum price undertakings. When it was found that the efforts made in the House of Commons to help the industry were in danger of being upset in the House of Lords, the Association circulated a further print of these representations among the House of Lords, which he happened to know was very effective, and did away altogether with the opposition that was likely to arise there. In fact, it was very necessary that the House of Lords and House of Commons should be really shown what the actual commercial position was in relation to the cost of coals and labour; and if the Association had done nothing more than circulate in the effective manner they did these prints both in the Commons and the Lords, they would have earned all the subscriptions paid for the year. The member for the part of Essex in which he and his son lived promised some of the consumers that he would oppose any measure of alteration or relief of the gas companies. When he received the printed statement of the Association, however, he declared that he had not really understood the matter before, and was very glad indeed to find that he had good ground for altering his opinion. The next item was £100 contribution to the cost of non-promoting companies in the same matter. There, again, they incurred expenditure which he thought they must all approve. They existed as a Protection Association for the assistance of companies whose finances were on such a small scale that they could not possibly conduct a parliamentary campaign "on their own bottom." He was in hopes that they might have contributed even more than this, because it was rather a burden on those who gave evidence before the Committee. It was a "financial hardship" for the smaller gas companies, who had to incur a good deal of expense; but it was very important that these small companies should state their case. Connected as he was with both small companies and great, perhaps he realized this more than others. There seemed to be an idea in some quarters that, if the big gas companies put forward their case, this would be all that was necessary; but he felt that the more the smaller scale companies could put forward their case of special hardship, the more they would reach the hearts of the Committee. ["Hear, hear."] The big companies were supposed to be prosperous, while the little ones had more sympathy. The item of £152 interest on loan was incurred chiefly by their patriotically investing in war loan; and on the other side of the account interest on the investment £195 quite overbalanced the charge. The expenditure totalled the modest sum of £966, of which about £500 had been incurred in the special fight on financial relief. Though this financial relief was very paltry from the point of view of the Government of a nation that had benefited so exceedingly in the war by the enormous service rendered by the gas industry (which service had always been so very handsomely acknowledged by Lord Moulton), still it was something; and at the last minute they were able to secure an advance from one-half to three-fourths of the standard or pre-war dividend, whichever was the lower. This outlay was met in part by subscriptions and donations amounting to £448. For this year—which might be considered a year of special stress, special conflict, and special trouble and anxiety to all of them—there was an adverse balance of £285, which, of course, when it was liquidated, would come out of the invested capital. The balance-sheet showed that they had investments worth (at cost price) £4404. Balance in hand and cash brought up the total to £4433, against which there were funds in hand at Sept. 30 of £1794, less the deficit, which made the sum £1508. And then there was a temporary loan from the bankers of £2925. This loan could, of course, be repaid at any time by the sale of some of the War Loan; and perhaps they might later on wish to have this done. Certainly they did appear to have a very large loan from the bankers; but, on the other hand, they had met a call from the Government for investment in War Loan, and he thought they did what their consciences would approve.

THE INCOME-TAX SUB-COMMITTEE.

Then with regard to the work of the Committee, they had had enormous service to all the gas undertakings in the kingdom rendered by the Income-Tax Sub-Committee, which formerly consisted of Messrs. Botley, Hazell, and Iorns, but had since been enlarged by the addition of Messrs. Ibbs and Stibbs. They had succeeded in getting very considerable easements, as was set forth in the report. The allowance for depreciation to those gas companies who had agreed to the scheme of 1912-13 was to be increased for the years 1918-19 and 1919-20 from 3 to 4½ p.ct. in respect of gasholders, and from 10 to 15 p.ct. in respect of gas meters and stoves. The arrangement was that, as regarded the financial year 1918-19, if income-tax had been paid before the new scale was approved, the difference was not to be recoverable by way of a return of income-tax overpaid, but should be allowed in the following year's accounts. The authorities, however, had since refunded the difference in cases where claims had been sent in. Their thanks were very specially due to the gentlemen on this Committee for their eminent services; and he hoped that before the meeting separated they would be accorded a special vote of thanks, because their labours must have been considerable.

LOAN CAPITAL DUTY.

Then reference was made in the report to the claim made by the Board of Inland Revenue to payment of loan capital duty on bank loans and temporary overdrafts granted by bankers to gas companies, which was referred to in the last report. After correspondence, the Committee were successful in securing from the Board a statement that where loan capital duty was paid, the Board would transfer 2s. of the duty paid thereon "towards the duty attracted by replacing the debentures or debenture stock." This the Committee regarded as a distinct concession.

THE BEILBY REPORT.

The next paragraph of the report referred to the report of the Fuel Research Board on "Gas Standards," a copy of which was forwarded to each member, with a request for observations on the various matters dealt with. This subject had moved, of course, in the last few days in a satisfactory manner; but he was not quite sure how far he was at liberty to say more than this. It was, however, he thought, common knowledge that there was every prospect that the restrictions under the new system of charge would be not such as they would find specially onerous, and that they would be toned-down to what, as he had remarked in a recent letter to the Technical Press, they were physically in a position to at once adopt, not only in the matter of inerts, but as regarded the purity of the gas. He had been satisfied with what had so far been agreed to on these points. He thought they would not have any limitation of sulphur; but they would have a limitation of inerts such as they could possibly live under and ultimately approach to.

ELECTRICIANS AND HEAT VALUE.

Meanwhile, it was his duty to say, as an old gas man, that it was his conviction that there would be considerable advantage to them in the new system of charging by units of heat. They were no doubt sufficiently well read in all the technicalities which had been discussed in the Press to know how entirely the position of electricians in the matter of heat had been overthrown by the investigations of Sir Dugald Clerk, Professor Cobb, and others acting in the interest of the gas industry. It should be clearly and plainly made known to all the members, to gas supplying bodies, and to the gas consumers more especially, that on a basis of heat charge, they would come out very, very much below electricity. The more this was known, the better it would be for gas. Some of them had feared that the change would jumble-up their accounts in a manner that would trouble the staff and mystify the consumers; but they might be sure that they would still make their bills out at so many thousand feet of gas, and that this would be stated on the account to be equivalent to so much heat. The means of ascertaining the charge would be the meter as hitherto. They would have to conform to the obligations they would enter into as to the uniform maintenance of the standard of heat which they might adopt; but what they would have to sell would be exactly what they sold now—a gas which, whether they had it in one shape or another, contained a potential energy of so much. He had seen a very beautiful apparatus for ascertaining what a company might be supplying in the way of heat. It would record within a very small limit of error what the heat of the gas supplied was from day to day and hour to hour. If it was below what they had undertaken to supply, there would be penalties.

THE ELECTRICITY SUPPLY BILL.

The Electricity Supply Bill did not demand much consideration. Lord Moulton was quite clear, as other scientific men were quite clear, that one could not convert fuel into steam, and make electricity, and then convert it back to heat, without loss, as compared with making gas and turning the gas into heat. There was a radical physical bar to the electrician ever realizing back again any large fraction of the heat he had dissipated in making steam. He did not know whether any of them remembered a paper that he read many years ago, in which he pointed out the very large number of leakages between the steam-boiler and the electricity produced. He thought that they could view without alarm these large schemes of electrical super-power stations, because, as a matter of fact, electricians themselves did not want them. Those who had sunk their capital were not happy about being bought out and superseded; and anybody who knew anything about the price of copper, &c., was aware that it was simply prohibitive as regarded large extensions. Even with this drawback removed, it would still be a great question whether it was cheaper to carry electricity through a copper rod as many miles as one could carry a ton of coals by railway or ship. This was a big matter of economy; and they had to learn about these things.

THE FINANCIAL POSITION.

After pointing to other items in the report, he said the Committee having considered the question of financial relief, he was happy to know that the Board of Trade had now intimated their intention to themselves bring in a Bill based on the report of the Fuel Research Board. So far as he could understand it—and it was only his own understanding, which might be wrong—the Board of Trade would be prepared to themselves urge Parliament to give them more liberal treatment financially, provided they accepted at the same time an obligation to sell gas by heating power rather than by direct illuminating power. No one had yet seen the Bill, so no one knew anything about it. One of the head men at the Board of Trade had stated on the previous day that he was not at liberty to say what it was going to be; it was not yet even in draft. It was very dangerous to comment upon a Bill that was not in draft; but, at any rate, it was pleasing to find that a Board of Trade official, in the presence of Lord Moulton, had spoken so plainly and vigorously of the right, and justice, and propriety of treating the gas companies with more consideration for their financial hardships. He did not dispute the position, but rather assented to it.

INQUIRIES.

The report gave a long list of inquiries regarding different matters which the Secretary had had to deal with. They embraced every possible detail; and they illustrated in a quiet but thorough way how useful the Association was to gentlemen living in the country, and not in touch with Parliamentary Agents and other legal authorities.

THE COMMITTEE.

Finally, the report gave particulars of the retiring members of the Committee. They were particularly sorry to lose Mr. Milne Watson, who had been of great use to them, and was a very regular attendant. The four vacancies arose, not through any feeling of antagonism, but because the gentlemen concerned found their time was so much occupied that they could not any longer place themselves at the disposal of the Association. He hoped some valuable names would be suggested to replace them. He concluded by moving the adoption of the report and accounts.

THE CASE FOR THE SMALLER COMPANIES.

Mr. H. TOWNSEND (Wakefield) seconded, and said he hoped that any alteration in the basis of charge would be such as to permit of easy comparison with electricity. In his town they had as competitors a very powerful electrical undertaking, that at the present moment were supplying electricity at 0·3d. per unit. They added other charges to meet the extra outlay caused by the war, which brought the price up to about 1d. Would it not be possible to offer a smaller unit of gas—say, 10,000 B.Th.U. at a certain price?

The CHAIRMAN: You want to sell them a pennyworth. It is more a matter of form than of essence.

Mr. TOWNSEND added that he hoped a pressure would not be fixed which, though it might be easy to work to in London, would be too much for small undertakings. Any general legislation would affect the smallest undertaking in the country; and flexibility was needed. The question of elasticity was of the utmost importance. There were so many adverse conditions in the industry that this was absolutely necessary to prevent hardship in the future.

The CHAIRMAN said it would be for the Association to watch the matter when it took the form of a Bill, so as to bear the burden as far as possible for the smaller companies. This was just where they came in. The great thing would be not to worry the Board of Trade at this stage.

Mr. R. HALL (Matlock) said he was glad to hear the Chairman state that they took an interest in the smaller companies. He supposed more than one-half of the companies made less than 20 million c.ft. a year; and there was a feeling among these small companies that their interests were not looked after by the great Associations which were controlled and carried on by gentlemen connected with the large companies, who naturally had their minds occupied with their own concerns, so that the small companies were very much left out in the cold. At the present time the position of companies making less than (say) 15 million c.ft. a year was a pitiable one.

The CHAIRMAN: To-day they are in the ditch.

AMALGAMATION THE REMEDY.

Mr. HALL: It is to be hoped that there will be a good deal of amalgamation.

The CHAIRMAN: That is one solution. The other is that the Association will take care of your interests.

Mr. HALL: With reference to your remark about there being little danger from electric power schemes, what about the Nottingham scheme, with 14 million pounds of capital?

The CHAIRMAN: It is a corporation-owned scheme.

Mr. HALL: They propose to supply 400 square miles; and we are in their area.

The CHAIRMAN: The Gas Light and Coke Company supply as big a district. They will not hurt you if you supply gas; but they will if you supply electricity. Mr. Hall, he said, had mentioned a matter that needed to be thoroughly threshed out. He himself was for a long time a great advocate of amalgamation. If there was a large company in a district, it ought to buy-out and protect its smaller neighbours, and take them under its wings, and give the shareholders a reasonable dividend for their outlay. This was far and away the wisest policy; and he hoped to see a good many of these amalgamations carried out. He had arranged many, and always with good effect. There must be no hard bargains. He had bought a company out of its area altogether. It offered itself to two others, and neither would give it fair play. Then he came in from miles away, and offered fair terms; and he was very proud to have done it.

THE PRICE OF GAS.

Mr. TOWNSEND said he took it that none of them had increased the price of gas beyond what was necessary to pay the restricted dividend allowed by the Temporary Increase of Charges Act. If they were to have relief in the matter of dividends, was it advisable to move now in the direction of increasing the price of gas to meet it, or had they better wait until the new Bill became law?

The CHAIRMAN: I should advise you to wait. The dividend itself, especially in the case of the sliding-scale companies, amounted to very little on the price of gas, compared with the other costs the companies had incurred. In the case of some of his companies, if they had had the power to pay the dividend, they could have done so. It would be very dangerous to try to trim the boat now, just before setting sail on the new sea.

The resolution was then put and carried unanimously.

NEW MEMBERS OF COMMITTEE.

The CHAIRMAN moved that they appoint again the three gentlemen who were willing to serve on the Committee—Messrs. R. Bruce Anderson, C. D. M. Belton, and G. H. S. Iorns.

Mr. A. A. JOHNSTON (Brentford) seconded.

Mr. R. W. EDWARDS (Aldershot) said that to fill three of the remaining vacancies he would like to propose Mr. Ralph Halkett, the new General Manager of the Sheffield Gas Company. He was a man of great promise, and would mean the accession of considerable strength to the Committee. The next names were those of Mr. George Stevenson, of Long Eaton, and Mr. J. W. Auchterlonie, of Cambridge, who were well known to all of them in the industry.

Mr. GEORGE CLARRY (Cardiff) seconded.

The CHAIRMAN: We have one from the North, one from the Midlands, and one from the Eastern Counties.

Mr. T. H. HAZELL (Newport) said he would like to propose as the fourth new member the name of a gentleman who had been of con-

siderable assistance to the Sub-Committee appointed by the Association for dealing with income-tax questions. He was intimately acquainted with the subject. In fact, he had acted as Secretary for the Committee who dealt with allowances for wear and tear in 1912. Last year, through the activities of the Sub-Committee, an additional allowance amounting to 50 p.ct. increase on the previous scale was granted for two years, and two years only. Now there had been another development. The Committee had impressed upon Mr. London that the same privileges which were allowed to factories generally under Schedule A, should be given to gas companies. They were told by Mr. London this was not possible at that time, because the law was against it. It was allowable to factories working under pressure for war purposes, but could not be made applicable to gas companies, because their buildings were not under the same conditions. Mr. London, however, expressed sympathy with the proposals, and said he was going to recommend that the same conditions should be extended to apply to gas companies. The Committee had met that day; and they concluded that the further allowance of the full six-sixths, instead of the five-sixths allowed under Schedule A would, subject to sanction, be applicable to gas companies. This was really the outcome of the effort that was put forward by the Committee, under his friend Mr. Botley, when they made representations to the authorities last year. In consideration of his services, he begged to propose that Mr. H. E. Ibbs, of the Gas Light and Coke Company, be asked to fill the vacancy that remained on the Committee. He felt sure he would be of considerable help, and a most capable and active worker in the gas interests.

Mr. EDWARDS seconded the proposition, and said those of them who had had the pleasure of working with Mr. Ibbs from time to time, both in regard to the Association and in other matters, knew he was a man of the highest qualifications. He felt that, if his engagements would permit him to join the Committee, he would be of the utmost value.

The CHAIRMAN remarked that they could not possibly do better than select the four names; and the motion was put and carried unanimously.

THE AUDITOR.

It was next agreed that Mr. W. Scott, F.C.A., should be re-appointed Hon. Auditor.

THE COMMITTEE ON INCOME-TAX.

The CHAIRHAN said they had now reached the end of the business, and he would like them to acknowledge by a special vote the services they had received from the Sub-Committee on Income-Tax. This was the sort of spadework some members had to do, and right well they had done it. He proposed a vote of thanks to the Committee.

This having been formally seconded, and carried,

Mr. C. F. BOTLEY (Hastings), on behalf of the Sub-Committee, said he was sure they appreciated the vote. But, of course, they had been working for themselves as well as for the Association; and their own concerns had all secured considerable benefit. The matter did, however, emphasize the importance of an Association of this character. Here was a question that could not be handled very well by the National Gas Council. It would have been out of their province to do so. He had been very much concerned as regarded depreciation owing to war-time, and particularly in the matter of deferred renewals; and when the income-tax people would not allow deferred renewals, he raised the question at one of the Committee meetings of the Association. By himself he was absolutely powerless; but with the combination of the members on the Committee and the strength of the Association, they were able to make a very good fight, and had now secured a very substantial concession. If the income-tax had remained stationary, the amount of money saved would, in one case he knew of, have been £1500 This collective action of going to Mr. Stanford London with the Association at the back of them, was very different from going and attempting to do it by themselves. Now they had the question of the one-sixth allowance, which the Committee raised at that time. He did hope that the members, when they had any matters of a parliamentary, legal, or rating character, would remember that this was a Gas Companies' Protection Association, and address their communications to it. If the Association needed the assistance of the National Gas Council to put questions on a broader basis, the members might rest assured that the Association would have sense enough to apply to the National Gas Council for help.

Mr. C. CREMER (Faversham), referring to the contemplated one-sixth allowance, asked whether companies generally had made up their minds as to the form of application to be made to the Surveyors of Taxes. It seemed to him a very necessary thing that the whole of the gas companies of the country should take united action on the matter. It was thought, he believed, it would be one-sixth on the rack-rent; but it appeared that in one or two cases the Surveyors did not take this view. No doubt the Association would in due time send out to the companies the necessary suggestions as to how they should make out the application. The forms had to be in very shortly.

The CHAIRMAN: The Committee are sitting on the matter now.

THE ASSOCIATION AND THE SMALLER COMPANIES.

Mr. EDWARDS, proposing a hearty vote of thanks to the Chairman, said Mr. Jones had dwelt upon the importance of the Association, particularly as applying to the small undertakings. There were 800 non-statutory gas undertakings in Great Britain, and 520 statutory ones. It seemed to him that whatever the Association might do in regard to large undertakings, it had a big duty to carry out in respect of the smaller ones. If its value could be made more widely known to the small undertakings, so that they could take advantage of the Association, it would be a good thing. They had to make up their minds that in the very near future the gas industry was going to accept an entirely new charter. They were not only going to pass a milestone, but to take an entirely new road.

Mr. HALL seconded the vote, which was heartily carried.

The CHAIRMAN suggested that the Technical Press might be of assistance—bringing the Association to the notice of these smaller companies. They had reduced the subscription to the small undertakings down to 10s. 6d. for the purpose of making it easy for them to join. It was surely, to the weak, who could not protect themselves, that a Gas Companies' Protection Association could be of use.

GAS-STOVE PROFITEERING CHARGES DISMISSED.

The Mitcham Case.

As was recorded in the "JOURNAL" at the time [*ante*, p. 142], the Committee appointed under the Profiteering Act sat at the Vestry Hall, Mitcham, on the 17th ult., to consider a charge of profiteering against the Wandsworth, Wimbledon, and Epsom District Gas Company, brought by Mr. Hayes, of No. 33, High Road, Merton. The Company were represented by Mr. GOSDEN (of Messrs. Sloper, Potter, and Gosden, Solicitors).

Complainant stated that he asked for a price to purchase two gas-stoves which he had had on hire for four years, and was told £6 17s. 10d. would be the price of the two stoves. He accepted the price, and forwarded his cheque, but informed the Company that he thought the charge was excessive, which they repudiated.

He was cross-examined at length by Mr. GOSDEN, who elicited the fact that, instead of having had the stoves four years, he had had one two years and the other three years. The Company wrote to Mr. Hayes offering, as he was dissatisfied, to cancel the transaction and return him the money. Mr. Hayes, however, did not reply, but brought the action.

Mr. GOSDEN said he believed it to be the first case against a London Gas Company that had come before the Profiteering Committee. The Company attached considerable importance to the view the Committee took, so he desired to give a rough outline of the practice which had been adopted by the Company with regard to the purchase of stoves installed on hire. In the Company's district, there were over 75,000 consumers who were hirers of stoves. The Company were under no obligation to sell stoves to their consumers; the only statutory obligation being to supply gas. He could not imagine a worse case than to attack a gas company for profiteering. Let them look at the position of the Company before the war and now. The sliding scale was such that, as the price of gas went up, so the dividends payable to the shareholders went down. As a result, the dividend paid by the Company in June, 1919, was £10,000 less than that paid in 1914—on the Wandsworth stock a fall of 41 p.ct., and on the Wimbledon stock a drop of 45 p.ct. He then submitted that the Committee had no jurisdiction to deal with the case. The statement he had offered was made under express instructions from the Chairman of the Company, who was very grieved that the case should be brought before the Committee; but he (Mr. Gosden) felt bound to take the legal point. There was an agreement by the Gas Company to sell, and by Mr. Hayes to buy, these stoves at this price. This, he submitted, was a concluded contract before the Act came into operation, and before the order by the Board of Trade. The Committee were not constituted until six weeks after the sale. Therefore it seemed to him that the Committee had no jurisdiction. The Company in this matter had nothing whatever to hide, and were prepared to give facts and figures for everything; but, as the legal representative of the Company, he was bound, on behalf of the shareholders, to take this view. He was quite prepared, if asked to do so, without prejudice to the legal position he had taken, to give the whole of the facts. Indeed, he was instructed by the Chairman to ask to be permitted to give them; but he must reserve the right of standing on his legal position.

The CHAIRMAN: I think if you would like to go on with the case on the understanding that you hold yourselves free to raise the objection without prejudice, it will be convenient.

Mr. *Charles W. Braine*, the Secretary of the Company, then gave evidence regarding the sending of the quotation and the acceptance of complainant's cheque. He had also prepared separate statements of accounts, the first dealing with 1916 and 1917, in which he showed that the total cost of one of the stoves was £2 8s. 4d., and the charge to Mr. Hayes was £2 1s. 3d.—an advantage of 7s. 1d., or 15 p.ct. The second stove cost £4 19s. 2d.; and for it Mr. Hayes paid £4 16s. 7d.—an advantage of 2s. 7d., or 2 p.ct. He submitted further an account on the basis of the prices ruling in August, 1919, in which he showed that for the first stove the present price would be £4 2s. 3d., and for the second stove £6 11s. 4d.—similar stoves having been sold to Mr. Hayes, already fixed, at £2 1s. 3d. and £4 16s. 7d., or 50 p.ct. and 26 p.ct. respectively below present prices.

Mr. *C. M. Croft*, Assistant Engineer to the Company, proved the prices of the piping and other apparatus connected with the fixing of the stoves.

The CHAIRMAN (after the Committee had deliberated) said they thought Mr. Hayes was quite justified, on the figures as he saw them, in bringing this case; but after hearing the evidence of the Gas Company, which had not been challenged, they had decided to dismiss the complaint, as they considered there was no case against the Company. Perhaps Mr. Hayes, in doing a public service, had also rendered a service to the Gas Company.

A Complaint at Hackney.

At the meeting of the Hackney Profiteering Committee last Wednesday, the hearing was continued of an adjourned case [*ante*, p. 196] in which Mr. Pascoe complained of the increased amount charged for the hire of a stove by the Gas Light and Coke Company, and the increased offer for sale of the apparatus on hire.

Mr. F. W. GOODENOUGH, for the Company, produced figures which, he said, would surprise both the Committee and the citizens who used the stoves. The stoves the Company now had on hire cost them over £900,000; the total number being 200,000. They had received as rent over £1,600,000; and the repairs had cost them £2,000,000. They were now asking only £790,000 for the stoves, which was one-third of the total net money they had spent upon them. The cost of the stove which complainant had was, in 1913, £3 3s., *plus* 10 p.ct. To this the Company added 15 p.ct. to cover establishment charges, making the total £3 18s. 9d., which was the figure quoted to Mr. Pascoe. The actual figures, if worked out proportionately to the general rise in everything connected with stoves recently, would make the price £7 2s. 6d.

The Committee, after a short deliberation, dismissed the complaint.

The Case against the Gas Light and Coke Company Collapses.

At a Meeting of the Westminster Profiteering Tribunal on Friday last, under the chairmanship of Mr. JAQUES ABADY, a series of complaints against the Gas Light and Coke Company were investigated.

The complainants were: Admiral Sir Herbert King-Hall, of 47, Sloane Gardens, S.W., who complained of the increase in the charge for hire of gas-stoves by 50 p.ct., and also of an offer to sell a stove 3½ years old at pre-war prices; Messrs. Sidney H. Hyman, Ltd., of 8, St. Martin's Place, W.C., who complained that an excessive price was asked for the sale of gas-stoves; the Rev. C. C. Peacey, of 17, Sydney Street, Chelsea, S.W., who complained that radiators installed at his mission were now offered him at double the price he was asked in 1917; and Mr. E. L. Oates, of No. 18, Page Street, S.W., who complained that the price of £2 8s. asked for a worn-out stove was excessive.

Mr. F. W. GOODENOUGH appeared on behalf of the Gas Light and Coke Company.

The CHAIRMAN, at the opening of the proceedings, said that, so far as the complaint against the increase in the charge for the hire of gas-stoves by 50 p.ct. was concerned, the Tribunal must dismiss that, as it was not a matter which was covered by the Profiteering Act. The Act did not deal with rates or charges for hire.

The cases with regard to the sale of stoves were the result of a circular sent round by the Company to all their consumers who have apparatus on hire, in which they are notified that the hiring charges will be increased by 50 p.ct., but intimating at the same time that the Company are willing to sell the apparatus to the present hirers—the prices being mentioned in each specific case. No mention is made in the circular as to how the prices at which the apparatus is offered are arrived at; but it was agreed that these prices represented four years' purchase of the present hiring charge, *plus* 50 p.ct.

The CHAIRMAN said the question the tribunal had to consider was whether the sale or offer to sell was, or would be, in view of the circumstances, unreasonable. He called upon the various complainants to state their cases.

The facts were as already outlined.

Mr. GOODENOUGH, in stating the case for the Gas Company, said he had not had any particulars in the case of the Rev. Mr. Peacey; and he would probably have to ask for an adjournment in regard to it. Notwithstanding the Chairman's decision that the Tribunal could not deal with the 50 p.ct. increase in the hiring charges, he would like to deal with the whole of the facts which had given rise to this complaint, although the Company were not called upon, legally, to answer for its policy in making this alteration. He was, however, anxious to satisfy the consumers who had complained and the public that the Company had not been taking advantage of present-day conditions to make undue profits out of the rent for hire. The public at the present time were suffering in more ways than one at the hands of the Gas Company, although not through their fault, in that the price of gas had been increased from 2s. 6d. to 4s. 8d. Now the rentals had been increased by 50 p.ct., and some people were apparently complaining of the terms upon which the Company had offered to sell them the apparatus they now hired, as an alternative to the increased rental, although he was glad to say that the great majority of the consumers seemed to appreciate the fact that the offer was a generous one, and were availing themselves of it in all directions. As to whether the gas industry was profiteering with regard to the price of gas, he had analyzed the figures for the gas companies in the Metropolis, taken from the accounts; and he found that the revenue from all sources had gone up from £10,000,000 in 1913 to £16,000,000 in 1918. In other words, the public had had to pay £6,000,000 more. But this increase was more than swallowed up by increased expenses; and the profits of the companies fell from £2,000,000 to £1,800,000. The cost of coal went up from £3,275,000 to £8,250,000; wages and other items increased the total cost from £8,000,000 to £14,250,000; while the profit was reduced from £2,000,000 to £1,800,000—the return on capital being reduced from 7½ p.ct. to 6¾ p.ct. Therefore the gas industry was not making an increased profit—not even the same rate of profit as before. With regard to rentals, the sums which had been charged before the increase of 50 p.ct., had never paid the cost of repairs to the stoves, to say nothing of interest on capital and depreciation. The capital cost of what the Company now had on hire was £905,000. The aggregate rentals received amounted to £1,691,100; and since the apparatus was first hired-out, the aggregate expenditure on repairs, attendance, and upkeep, was £2,015,000, or £324,000 more than had been received in rentals. If the Company had been able to make a charge in their accounts for interest on capital, it would have amounted to £1,022,000. In other words, the Company had expended £2,250,000 more than they had received in rentals. They were making a loss before the war; and they were making a still greater loss with the 50 p.ct. added. Now came the question of the terms on which they had offered to sell the apparatus to their consumers. This offer was an entirely voluntary one, and was designed to give the consumers an opportunity of buying their stoves at a very favourable figure instead of paying the increased rental. The total figure at which they had offered the stoves to the public amounted to £792,000, although they stood in the Company's books on balance at £2,250,000, in regard to what had been spent on them in addition to the rents that had been received. The original value of the stoves was £906,000. The stoves which cost £906,000 would cost over £2,000,000 to-day. They were making their consumers an extremely favourable offer as an alternative to the increased rent. Many of the consumers evidently regarded the offer as a favourable one, because the Company were having a difficulty in dealing with the number of cases in which the offer was accepted. The offer carried with it the undertaking that, before the transfer of the stoves took place from the Company to the consumer, they would be put into full repair.

In answer to the CHAIRMAN, Mr. Goodenough said that the Company had depreciated their capital to a certain extent out of profits; but they had not been able to set aside out of rentals anything for

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depreciation in regard to stoves. The stoves now stood in the books at £700,000; but this was obsolescence rather than depreciation. The stoves, however, had been kept at full value out of revenue. The figure in the capital account was 10 p.ct. less than they were getting for the stoves now; but they would be justified in adding for appreciation anything up to £1,000,000, because of the enormous rise in the value of such apparatus. The capital involved in the stoves had had to have interest paid on it; but it came out of the general profits of the undertaking and not out of the rentals.

The TOWN CLERK suggested that the Company got back, by way of an increased charge for gas, anything they may have lost on the hire of stoves.

Mr. GOODENOUGH reminded the Town Clerk that the dividends had to be reduced if the price of gas was increased.

The TOWN CLERK said his point was that the hire of stoves had not been the full loss which it appeared to be on paper.

Mr. GOODENOUGH agreed that the hire of stoves had been good business. But what might seem a good policy from the point of view of the arrangements of the Gas Company would also be a good policy from the point of view of the consumer, because out of every £100 additional profit the consumer took £85, and the shareholder only £15. The Company were now distributing 3 p.ct., against £4 17s. 4d. p.ct. before the war. Referring to one of the gas-stoves installed in the premises of Messrs. Hyman, he said that its cost when it was fixed was £1 18s. 6d.; and the price charged to Messrs. Hyman was £2 10s. The present cost to the Company would be £4 6s. 8d.; and the selling price £4 19s. 6d. The stove was being offered to Messrs. Hyman at £1 16s., or 2s. 6d. less than it originally cost.

Mr. HYMAN said that was so; but they had paid 6s. per year hire for 15 years.

Mr. GOODENOUGH replied that during the whole time the Company had been incurring more for repairs than had been received in rental.

A MEMBER OF THE TRIBUNAL commented on the fact that 50 p.ct. was added to the present hire, and then four years hire taken as the purchase price. The stove might not last that time.

Mr. GOODENOUGH said if the stove had to be replaced at present it would cost 2½ times its original price; and the very fact that the stove had been found useful after 15 years showed that it had been kept in repair by the Company. He submitted that the stove would be just as useful in 15 years' time as it was now.

Mr. HYMAN said he wanted to point out that, though the Company offered him a stove for £1 16s. which cost £1 18s. 6d., he had already paid the cost of it in the rental over the period of years he had hired it. The figures that had been given for repairs related to the whole of the Company's business, and not only to stoves.

Mr. GOODENOUGH said the figures he had given related only to the repairs of the stoves and apparatus which were now being offered for sale, and had nothing to do with gas-fittings or anything else.

This completed the case for the Gas Company.

The CHAIRMAN then called for any comments by the complainants.

Admiral Sir HERBERT KING-HALL said that the Company's offer to put the stoves in an efficient state of repair placed a different aspect on the first offer which was made, and removed, to his mind, a good deal of the cause of complaint. At the same time, he was still of opinion that stoves which had been rented for three years, as in his case, ought not to be offered for sale at a price higher than the original cost. He was quite satisfied in regard to the repairs that had been done.

The CHAIRMAN asked whether the Company would take steps to inform the people to whom the offer to sell stoves had been made that they would be put in a state of repair before the transfer took place.

Mr. GOODENOUGH: Yes.

The CHAIRMAN: Can the Tribunal take it as an undertaking on your part that full and ample publicity will be given to this.

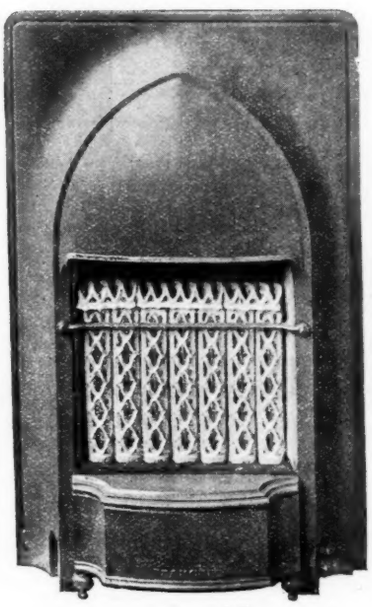
Mr. GOODENOUGH replied in the affirmative. He added that the date would be extended from Oct. 31 to Nov. 30, during which advantage could be taken of the offer to sell without the increased hiring charge taking effect. In the case of Admiral King-Hall, the stoves were offered at £14 2s.; the rent amounted to £10; and the cost of the stove when fixed was £22. Meantime, the Company had had all the risk of the repairs. To replace the stove to-day would cost £37.

Mr. E. L. OATES, who said that his stove was in a bad state of repair, now expressed himself satisfied with the offer of the Company to put it in repair before sale.

Mr. HYMAN expressed himself as still not satisfied.

In the case of the Rev. C. C. PEACEY, the chief complaint was that he was offered his radiators for sale in 1917 at a price about half that now asked. But in view of the fact that the Company had not been furnished with full particulars in this instance, it was agreed that the matter should be discussed between Mr. Peacey and the Company with a view to a settlement being arrived at. In the event of an arrangement not being come to, the Tribunal will deal with the matter. Technically, therefore, the consideration of Mr. Peacey's complaint was adjourned.

The CHAIRMAN, in giving the decision of the Tribunal in favour of the Gas Company, reviewed the circumstances as brought out during the hearing. While there must be certain cases where the stoves had been on hire for a number of years, in which the price at which the stoves were now offered for sale would appear high, the Tribunal was satisfied from the aggregate figures—and they could only deal with the aggregate figures—that the Company had given good service as a whole for the rents they had received. The Tribunal therefore thought that, having regard to the manner in which the stoves had been kept in repair and the expenditure which had been incurred in so doing, it was impossible to sustain the contention that the Company's offer of the present selling prices was profiteering. The Company had offered through their representative to put the stoves into a complete state of repair; and this offer had been given in the form of an undertaking on the part of the Company. The question of the increased charge for hire did not come within the purview of the Profiteering Act.



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STOKE AND THE COAL CONTROL DEPARTMENT.

The Chief Engineer and General Manager of the Stoke gas undertakings, Mr. A. Mackay, has issued a report in which he makes serious complaints regarding the treatment the Gas Committee have received from the officials of the Coal Control Department. The report, which the Council have decided to make public, is in the following terms:

I wish it to be understood before the winter that the position of the Gas Department regarding its coal supplies is very serious; and I anticipate that before Christmas, unless the supplies of coal are very materially increased, the district, if not entirely without a supply of gas, will have the supply considerably reduced. The intolerable conduct of the Coal Control Department towards the Gas Department should also be reported. For about two years past the coal supplies to the gas-works have been a source of very serious concern to the Gas Committee and myself; and I have no doubt it will be recognized we have done all that is humanly possible to improve the position. Shortly after the Minnie Pit disaster, although all our coal supplies for the Stoke works came from this colliery, the Coal Controller, instead of assisting us to get coal from other sources, actually reduced the deliveries to the Longton works by 115 tons per week; and, as is generally known, in the month of November last the Coal Control Department closed-down the Silverdale Pit, whence a portion of the supplies of three of our works was drawn.

On several occasions the Gas Committee have sent deputations to interview the Coal Controller at his office in London; but these efforts not proving of any avail, the Committee decided that the question should be raised in the House of Commons, which was ultimately done. I consider it is reasonable to state that, from all our experience, the officials of the Coal Control Department have not only defied the Gas Committee of Stoke-on-Trent and their Engineer, but they have also defied the local Members of Parliament, because, in the very week that the question was raised in the House, I had a telephonic communication from an official of the Coal Control Department telling me I must take supplies of coal from Durham, as he would not on any account release further supplies from the local collieries. So that the financial loss suffered by the Gas Department may be appreciated, I append information as to the comparative results obtained from local and South Pelaw coal, Durham. The production from the local coal was equal to £3 17s. 2d. per ton, as compared with £3 1s. 3d. from South Pelaw coal. Coke produced from South Pelaw was also heavier, on account of the large percentage of stony and foreign material it contained. From this statement it will be seen that, over and above the financial loss from the inferior quality of Durham coal, of 15s. 11d. per ton carbonized, we have to pay a sum of 8s. 3d. per ton more for this fuel. Unfortunately, these sums do not represent all the losses and inconvenience caused; for the plant required to maintain our daily demands in Durham coal must obviously be increased by fully one-third, on account of the decreased make of gas per ton. The labour is therefore equally increased. The South Pelaw coal contains a large percentage of stone, shale, and other foreign material very much heavier than coal, for which we are expected to pay the same price as for coal, although there is no revenue derived from them. When I say that there is no revenue derived from this foreign material the case is only half-stated, because when the coke from this material goes into the producers a very large quantity of ash is deposited, thus increasing the labour of the workmen. This coke also causes the consumers throughout the area serious inconvenience, on account of its heavy ash content. The losses are still further increased from the fact that we have nineteen private wagons at the Longton works lying idle most of the time, on account of not being able to get coal supplies from our usual local colliery.

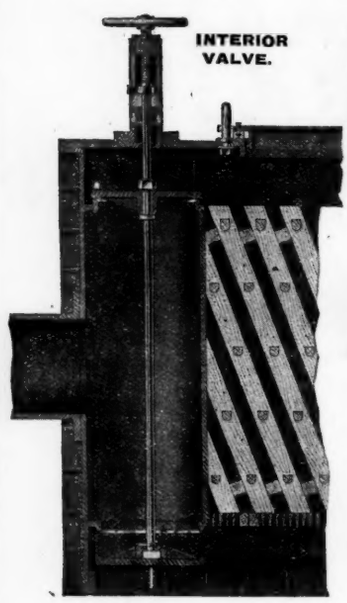
The report was discussed at a meeting of the Stoke-on-Trent Council on the 24th ult., when it was decided to appoint a Committee to confer with the local Members of Parliament, and take such action as may be necessary to secure fair and equitable treatment in the obtaining of the coal required for the maintenance of the public services.

Disabled Men in the Gas Industry.—When the question of employing disabled men, in accordance with the King's appeal, was raised in the Burnley Town Council, Alderman Emmott said the proportion of disabled men employed by the gas department was 10 p.ct.

Gas Profits at Keighley.—A net profit of £10,849 has accrued from the working of the Keighley Corporation Gas Department for the year ended June 30 last. The present price of gas to consumers is 2s. 11d. per 1000 c.ft.; a proposal, a short time ago, to increase the price by 6d. per 1000 c.ft. having been withdrawn. After various transferences, including £625 in relief of rates, £4512 is carried forward to next year.

Condition of the Batley Gas Plant.—The quality of the gas and the condition of the plant came in for criticism at Batley during the recent municipal election campaign. Blame was attributed to the out-of-date condition of the plant, which it was stated would have been modernized long ago, had not the Government vetoed the scheme for re-instatement during the war period. New plant is to be installed at the earliest possible moment.

Coal Unfit for Gas-Making.—Strong complaints were voiced at the last meeting of the Dewsbury Town Council with respect to the bad quality of the gas now being supplied. The blame was attributed to the poor quality of the coal, which the Chairman of the Gas Committee (Ald. J. M'Cann) said was in the proportion of 25 p.ct. absolutely unfit for the purpose of making gas. The gas-workers had his sympathy; for they had to deal with masses of clinker which closely resembled pig iron, instead of coal. He was hopeful that a speedy improvement would be effected.



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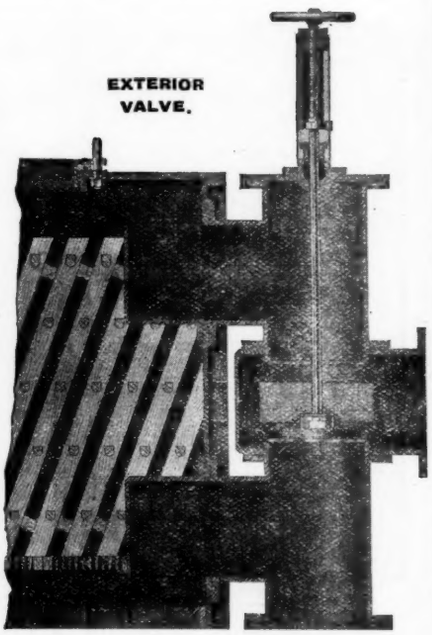

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CEARÁ GAS COMPANY.

Troublous Times.

The Annual General Meeting of the Company was held last Friday, at the London Offices, No. 9, Queen Street Place, E.C.—Mr. F. W. BROTHERS, the Chairman, presiding.

The SECRETARY (Mr. E. Pratt) read the notice convening the meeting; and the report and accounts were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said he much regretted he had not a better state of things to comment upon; but they had had many difficulties to contend with. The year under review had been a very severe one for the majority of over-sea gas undertakings, causing exceptional strain on the managements and staffs, to which Ceará had been no exception. The exigencies of the war situation causing at a critical stage the last of the coalfields of France to close-down, together with the need for the maintenance of the coal supply of that country, as also for Italy, brought about a complete suspension of exports of gas coal from this country to other parts of the world. This occurred soon after March, 1918, when the last small quantity of gas coal was obtained for Ceará from this country. Although it was understood that the Coal Exports Committee had made arrangements for coal to be supplied from the United States of America to various destinations other than Europe, restrictions on the export of high-grade gas coal were still found to be in force there, which were not removed, as far as could be ascertained, until some time in January last. Owing to the lack of transport in the United States—all available tonnage being mostly commandeered for the conveyance of troops and stores to France—the monthly steamship service from the United States to the northern ports of Brazil could not be maintained. This service ceased about the end of June, 1918, and was not resumed until January last. The restrictions on export (following the armistice) were then removed; and the release of steamships enabled the service to be partially resumed. So the Company had been enabled to forward small quantities of coal as, and when, the opportunity occurred. He had mentioned these facts in order to give the shareholders some idea of the difficulties encountered during the year ended June 30 last. As indicated in his remarks last year, the cost of all materials had made itself felt on the expenditure in Ceará. Coal in the United States of America cost somewhat less per ton than in this country; but, on the other hand, the rate of freight fixed by the United States control for supplies to the Allied Countries was somewhat more. Also it should be mentioned that up to the end of June a decline had taken place in the exchange between New York and London of about 5 p.ct. as against the latter city—the paper currency here not having maintained the standard value of the pre-war pound sterling in regard to its equivalent in dollars. Since then a further decline had taken place, which, if it continued, would have the effect of again increasing the cost of both coal and freight. Local substances which had had to be used as an adjunct to carbonization, &c., had proved more expensive than coal; the difference in cost being estimated at about £500. They had to pay higher prices for all materials other than coal; the difference being from two to two-and-a-half times the pre-war rates in Ceará, and amouting to some £1000. The debenture interest was less by the income-tax deducted at 6s. in the pound, which, however, augmented the item under this head; and the tax had to be paid over to the Inland Revenue Authorities. But the Company were not assessable in respect of their profits. Travelling expenses were exceptional. The item of £527 represented the passage money of six persons all falling into one year. The Engineer not having been home for five years, it was necessary, owing to the shortage of staff, to send a special substitute during his vacation, the remuneration for whose services was included in this item. General charges showed an increase; the cost of books, stationery, and printing in Ceará being more costly under war prices. Owing to the defective mail steamer services, correspondence had been much delayed; and the cost of cables was somewhat more the last two years. Prices might become gradually easier in the future (as indicated by the lower charges for certain articles in brass), but were unlikely, he was afraid, to fall to the levels prior to the war. The cost of living in Ceará having increased very much under war conditions, it became necessary to make a suitable increase in the pay of the staff out there, which would take effect in the current year; and as if to exemplify the old adage that "troubles never come singly," it was reported that a partial drought had most unfortunately been experienced in certain parts of the State, which might reduce the current crops for export, and consequently the revenue of the State. After inflicting on them this lengthy catalogue of the evils from which the Company had been suffering, he would like to hold out a prospect of better conditions; but, in common with almost all gas undertakings overseas, as well as the majority at home, the Company were passing through troublesome times, and it was difficult to make any forecast for the future.

The motion was seconded by Mr. F. A. WALLROTH, and unanimously passed.

The retiring Directors (Messrs. F. W. Brothers and T. M'Making and the Auditor (Mr. W. J. Wright) were re-appointed.

A vote of thanks was passed to the Engineer and Manager (Mr. W. A. V. Watson) and the staff in Ceará, and the Secretary in London—on the proposition of the CHAIRMAN, seconded by Mr. WALLROTH.

The Chairman and Directors were also thanked for their services.

Ill-Effects of the Gas Reduction Order.—The difficulties which manufacturers are encountering owing to the reduction in gas quality and pressure ordered by the Board of Trade during the railway strike, was commented on at last week's meeting of the Birmingham Chamber of Commerce. Mr. Barlow stated that some Oldbury firms were suffering out of all proportion to the necessities of the case. Trade was receiving a set-back; and a considerable number of people had been thrown out of employment. It was decided to write to the Board of Trade asking that the Order be rescinded.

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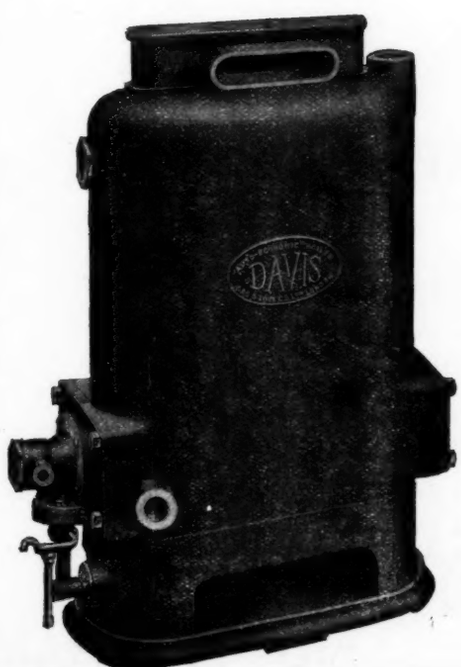

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CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Nov.* 3.

In the London market, pitch continues in good demand; the price being firm at over 80s. per ton net in bulk at makers' works. Creosote oil is firm at about 6½d. per gallon net. In other products, prices are as follows: Solvent naphtha, 2s. 6d. per gallon net. Pure benzol and toluol, 2s. 9d. per gallon filled into buyers' packages. Pyridine bases, 4s. 3d. to 4s. 6d. per gallon. Anthracene, 48 to 50 p.ct., 9d. per unit, casks free.

In sulphate of ammonia, the position remains unchanged.

Tar Products in the Provinces.

Nov. 3.

The average values for gas-works products during the week were: Gas-works coal tar, 38s. to 43s. Pitch, East Coast, 70s. to 72s. 6d. per ton f.a.s.; West Coast—Manchester, 62s. 6d. to 65s.; Liverpool, 62s. 6d. to 65s.; Clyde, 72s. 6d. to 75s. nominal. Benzol 90 p.ct., North, 1s. 8d. to 1s. 10d.; crude 65 p.ct. at 120° C., 1s. 0½d. to 1s. 1½d. naked at makers' works; 50-90 p.ct. naked, North, 1s. 8d. to 1s. 10d. Toluol, naked, North, 2s. to 2s. 1d. nominal. Coal tar crude naphtha in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 2s. 3d. to 2s. 4d. Heavy naphtha, North, 2s. 1d. to 2s. 3d. Creosote, in bulk, North, liquid, 5½d. to 5⅝d.; salty, 4⅝d. to 5d. Heavy oils, in bulk, North, 6d. to 6⅛d. Carbolic acid, 60 p.ct., 1s. 6d. to 1s. 6½d. Naphthalene, £15 to £17 10s.; salts, £4 10s. to £6, bags included. Anthracene, "A" quality, 7½d. to 8d. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

Business continues along the lines already reported, although in one or two districts uncertainty is expressed regarding the outlook, which tends to restrict development and drives traders to a hand-to-mouth method of meeting their requirements. Pitch remains very firm in London, and further advances seem likely on the demands for shipment, which has the appearance of continuing well into the new year. Inquiries coming to hand suggest that buyers are not afraid of any fall; but it seems very doubtful whether prices can go much higher. Crude tar prices have been advanced. Creosote is a strong market, and special fuel oils are dearer; the tendency being to use these more freely. Refined naphthalene is dull; but prices are steady. Crude salts are a shade dearer. Cresylic acid is firm; but carbolics have slipped-back into the slough of despond once more. Crystals are worth no more than 7½d. to 8d. per lb., and makers cannot afford to pay a price for crudes which would make them worth producing. Working expenses, of course, are generally higher than before the war, and prices which would have been worth while then are of no use now. Crude benzol is scarce and dearer. Naphtha remains firm, although supplies are now rather easier to obtain. Other products are without much change.

The range of quotations is as follows:

Benzol: 90% London 2s. to 2s. 2d., North 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 10½d. North; crude, 60-65% 1s. 5d. to 1s. 7d.; pure, 3s. per gallon naked.

Carbolic Acid: Crude 60's 1s. 6d. per gallon nominal; crystals, 40%, 7½d. per lb.

Crude Tar: London, 50s. to 55s.; Midlands, 50s.; North, 50s. per ton *ex* works.

Pitch: London, 80s. to 85s. per ton; East Coast, 70s. to 75s. per ton; West Coast, 67s. 6d. to 72s. 6d., with Manchester 70s. per ton and Glasgow 72s. per ton; South Wales, 64s. to 68s. per ton.

Solvent Naphtha: London, 2s. 6d. Provinces average 2s. 7d. per gallon.

Crude Naphtha: Naked, 9d. per gallon.

Heavy Naphtha: 2s. 5d. per gallon.

Naphthalene: Refined, £16 to £18 per ton nominal; crude, £6 5s. to £11, according to quality.

Toluol: Naked, 2s. 6d. per gallon nominal. North, 2s. 5d. Pure, 3s.

Creosote: London, 7¼d.; North, 5⅝d. to 6¼d.; heavy oil, 6d. per gallon in bulk.

Anthracene: 40-45%, 7d. to 7½d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Aniline Oil: 1s. 2d. per lb.

Cresylic Acid: 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d. *ex* works London, f.o.b. other ports.

Sulphate of Ammonia.

There is not much change in the situation, except that costs of production are unfortunately on the up-grade. The home trade is without alteration. Export prices remain under critical consideration, particularly in connection with later positions. Spring trade is likely to be good, especially in view of the present situation in the United States, where the coal strike will seriously interfere with production and movement.

Chamber of Commerce and Birmingham Gas.—The Council of the Birmingham Chamber of Commerce having complained of the quality of the gas being supplied in the city, the matter was referred to at a meeting of the Gas Committee by the Chairman (Alderman Lloyd), who said that in Birmingham they did not hold a stock of coal sufficient for more than ten days' carbonizing. Indeed, they actually had a smaller stock at the present time than last year. Shortage of coal was the sole reason for the low quality of the gas; and until supplies were greater, and opportunities were afforded for more extensive storage, he did not see any solution of the difficulty.

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Quality of Gas Leads to a Strike.—The poor quality of gas being supplied in Nelson led to a strike of weavers at Messrs. James Tattersall and Son's Seedhill Mill on the 29th ult. The operatives complained that they could not proceed with their work, and at 4.50 p.m. turned out in a body. As similar complaints had been made at other mills, the attention of the Gas Committee has been drawn to the matter.

Gas Quality at East Grinstead.—A petition signed by 156 ratepayers of East Grinstead, which has been received by the Council, calls attention to the inadequate supply of gas for lighting and domestic purposes. The Council agreed with the opinion of the Gas Committee that the complaint was a justifiable one, and that the Board of Trade should be asked to allow them to test the gas, in order to see whether the Company were supplying 425 B.Th.U.

Offer of the Douglas (Lanarkshire) Gas-Works.—The Secretary of the Douglas Gas Light Company has written the District Committee of Lanarkshire offering to sell the gas-works. The Chairman of the Committee said they would like to know the reason for selling. Mr. Wilson, a member of Committee, replied that the pipes and retorts were finished. The plant had been in use for about seventy years. It was agreed to allow the letter to lie on the table, until an application on the subject was made on behalf of the ratepayers.

Verticals for Stockton.—The Stockton-on-Tees Corporation have applied to the Ministry of Health for permission to borrow £55,475 for the installation of vertical retorts at the gas-works; and the Ministry have ordered a public inquiry, which will be held at Stockton to-morrow (Wednesday). There is a certain amount of opposition to the Corporation's proposal, as it is felt in the place that arrangements should be possible similar to those in operation in the neighbouring town of Middlesbrough, which by availing itself of coke-oven gas, is able to supply at 2s. per 1000 c.ft., as against Stockton's 3s. 11d.

Electricity not Forthcoming at Tuam.—The Tuam Electric Lighting Company having intimated last month that they were unable, because of the railway crisis, to get material to enable them to fulfil the contract (still unsigned) to proceed with the construction of works, steps were taken to continue gas lighting. Mr. P. Byrne, at a meeting of the Urban Council, said the failure of the Company to proceed placed them in a very awkward position. It was very silly of the Company to tender when they had no idea as to how long it would be before they could light the town. If the Council had not accepted the tender, they would not have had the gas light shut-out and the town left in darkness.

Ineffectual Representation by the London County Council.—The Public Control Committee report to the London County Council that the Gas Light and Coke Company gave notice on Aug. 8 of their intention to apply to the Board of Trade for an Order under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, to enable them to raise the price of gas from 4s. 2d. to 4s. 8d. per 1000 c.ft., as from the date of the meter readings in September. The Company gave as the reason therefor the increase of 6s. a ton in the cost of coal, which took effect on July 21. The Committee made strong representations to the Board of Trade in the matter; but the Board, on Sept. 1, issued an Order as desired by the Company.

End of the Benzol Trials.—The 5000 miles test of a "Triumph" motor cycle, and the 10,000 miles test of a "Sunbeam" car, using benzol as fuel, will be concluded to-morrow (Wednesday) afternoon. The "Sunbeam" car commenced its running test on Aug. 28, while the "Triumph" motor cycle started on Sept. 11. Since these dates, they have traversed practically all the main roads in the country from Lands End to Inverness. The tests were instituted with the object of reassuring motorists as to the suitability of "N.B.A," benzol as an efficient and safe fuel for motor vehicles. At the close of the tests the engines will be taken down and carefully examined; and in due course a full report on their condition will be issued.

Price of Gas at Hull.—At the last meeting of the Hull Corporation Gas Committee, reference was made to the increased charges of the local Gas Companies. Intimation was given to the Corporation that the price of the gas supplied to them in bulk by the British Gaslight Company, for distribution in the Old Town, would be increased from 1s. 10d. to 3s. per 1000 c.ft. Replying to criticism of the advances, the Water Engineer said that Hull was not as unfavourably situated as other cities—notably Leeds, where the price of gas had gone up from 4s. 2d. to 5s., and Edinburgh, where the advance was from 5s. to 5s. 8d. The stove and meter rents had been increased by 50 p.ct.; but the case of the gas companies was that both labour and materials had gone up over 100 p.ct. The Lord Mayor said he was not disposed to accept the reason given for the advance of the stove and meter rents as being altogether reasonable.

Manchester Gas-Works' Coal Supplies and the Yorkshire Miners' Strike.—A report prepared by the Superintendent of the Manchester Corporation Gas Department states that during the miners' strike in South and West Yorkshire, when the stocks of coal at the gas-works were low, the Coal Controller offered a seaborne cargo of Durham coal. He said that only on the Gas Committee's acceptance of it would he be responsible for keeping the works supplied. A strong protest was made on behalf of the Gas Committee on the grounds of cost; and the Coal Controller was informed that the Committee would be willing to pay the railborne cost. A cargo, however, had already been sent to the Manchester docks, and was followed a week later by a second cargo, making in all 7602 tons. The cost was £20,124 14s. 9d. (or 53s. a ton), as compared with £14,154 14s. 2d. (or 37s. 3d. a ton), which would have been the cost of it by rail direct from the same Durham collieries. The coal was of very inferior quality, causing much trouble and expense in working the retorts; and the coke derived from it was practically valueless. Payments on account amounting to £12,334 having been made (£1819 being retained for inferior material from the sum of £24,154), it was proposed that the balance of the total account—viz., £7790—should be referred to the Coal Mines' Department for payment. At a meeting of the Gas Committee, it was decided, after the reading of the Superintendent's report, to leave the matter in the hands of the Chairman, with authority to take any steps necessary to protect the interests of the Committee.

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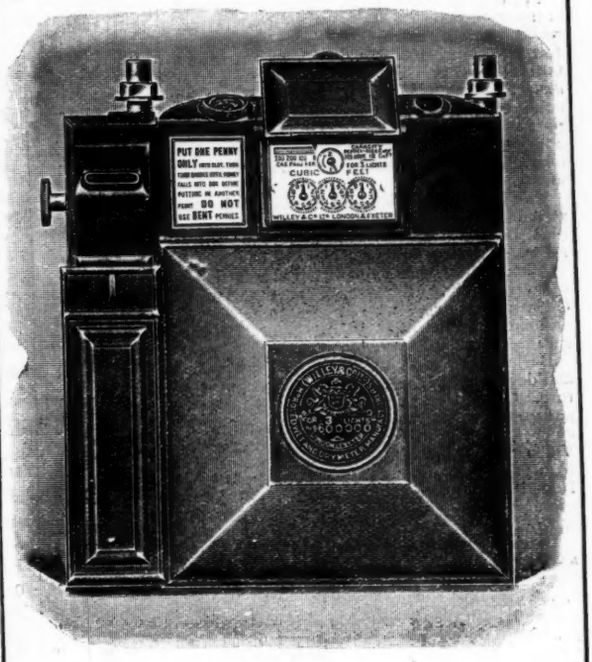

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Creosote and Tar for Steam Raising.—In connection with the suggested use of oil fuel instead of coal for raising steam at the infirmary, the Camberwell Guardians have received a report from their Engineer (Mr. G. E. Merrall), according to which the adoption of liquid fuel would be attended by the following advantages: Storage of coal and the removal of ashes would be eliminated. The dust nuisance would be abated. The engineering staff could probably be reduced. Sweeping of boiler flues and economizer would only be necessary at long intervals. The saving effected on these items would probably be about £600 per annum. In addition, it must cost the Borough Council at present between £200 and £300 per year to remove the boiler refuse. Most of the oil is a hydrocarbon oil for which a quotation of £6 10s. per ton, *plus* 15s. for cartage, had been obtained. Fuel at this price seemed out of the question; but the South Metropolitan Gas Company quoted 85s. per ton, *plus* 5s. for cartage, for a mixture of creosote and tar, which is claimed to have an equal calorific value. Taking into account the estimated saving and other considerations, the Infirmary Committee propose to instal the liquid fuel system.

Effect of High Rating at Airdrie.—Bailie Goldie, Convener of the Airdrie Corporation Gas Committee, addressing a meeting of his constituents in the Second Ward, said that the gas undertaking had been seriously hampered during the past five years with lighting restrictions, the increased cost of labour, and large advances in the price of coal. Nevertheless, by careful and capable management, as well as loyalty on the part of the whole staff, their position to-day would compare favourably with that of other enterprises throughout the country. In spite of the recent advance in coal, the department were able to avoid any increase; but since presenting the budget for the current year, the local rates had been fixed, and involved, in excess of their estimate, an additional charge of about £600—requiring fully 2d. per 1000 c.ft. increase for the remaining part of the financial year. Recently the Gas Committee had had under consideration the installation of modern vertical carbonizing plant; but after thorough inquiry and investigation, it was found that the present exorbitant price of the plant rendered the scheme financially unsound. The Council agreed, and the further consideration of a vertical retort installation was delayed.

STOCK MARKET REPORT.

THE Stock Exchange has had a quiet week on the whole, though there were some exciting moments in the Miscellaneous quarter. The House was prepared for great things to happen in the Government's financial campaign in the Commons, but took it calmly when the battle fizzled-out ingloriously and unsatisfactorily. The general tendency was flat almost up to the close, when matters seemed to brighten up a little.

In the gilt-edged market, Home Government issues were depressed—prompted in a measure by the Chancellor's faint approval of a State Lottery Loan. Friday's best figures showed a falling-off—viz., Consols 52, War Loan 92½ *ex div.*, Funding 77⅛, Victory 84⅛. But Soudan continued to rise. Home Rails met with support and made some recovery. Canadians did not amend; the labour storm centre being too near. Argentines continued to show improvement.

The Foreign Market was decidedly flat all round. French, Russian, Greek, Dutch, Swedish, Belgian, Chinese, Japanese, and Chilian, all were down.

Among the Miscellaneous group business was very lively. Rubber was active and firm. Oil was stimulated by rumours and reports, and big operations took place. Breweries, Insurance, and Shipping were firm.

Business in the Gas Market was moderate and devoid of any particularly noticeable feature. General steadiness was the main point, and apart from *ex div.* variations, the only change in quotation was a rise of 3 in Monte Video. Gas Light ordinary and both Tottenham changed hands at advanced prices. Imperial Continental, however, did not quite come up to the mark of the previous week.

Bargains done for cash during the week were as follows: On Monday, Brighton and Hove original 123¼, Commercial debenture 51½, Gas Light ordinary, 59¼, 59⅜, 59⅝, 60, ditto maximum 46½, ditto preference 66⅛, ditto debenture 53, Imperial Continental 134½, 135, 136, Primitiva 30s., 31s., 31s. 9d., 33s., ditto preference 65s., 67s. 6d., South Metropolitan 58, ditto debenture 53, 53¼, Tottenham "B" 50, Tuscan 32s. 6d., Cardiff 5 p.ct. Consolidated 75. On Tuesday, British 25, European 12½, Gas Light ordinary 59⅝, 60, ditto maximum 46½, ditto preference 65⅛, 66, 67, Imperial Continental 136, Primitiva 32s. 6d., ditto preference 66s. 6d., South Metropolitan 58⅛, 59¼. On Wednesday, Brentford "A" 55⅜, Gas Light ordinary 59, 59¼, 59⅜, 59⅝, 60¼, ditto maximum 46, ditto debenture 52⅞, Imperial Continental 133, 134½, 135, 136, Primitiva 32s. 3d., 32s. 6d., 35s, ditto preference 66s. 6d., River Plate 51, 51⅛, South Metropolitan 58, Tottenham "B" 54⅜. On Thursday, Commercial 4 p.ct. 55½, ditto 3½ p.ct. 52, Gas Light preference 66⅛, Imperial Continental 134, 134½, Monte Video 69, Primitiva 31s. 10½d., South Metropolitan 59, ditto preference 95. On Friday, British 25½, Gas Light Ordinary 60, 60⅛, 60⅜, ditto preference 66, 67, 67⅛, Imperial Continental 133, 134, 134½, Monte Video 67, 69⅜, South Metropolitan 59, 59⅛, Tottenham "A" 74.

In the Money Market there was a very fair demand, which was maintained throughout the week; rates closing firm, and discount rates hardened. The price of silver reached the new record of 66½d. per oz. on Wednesday; but it dropped 1d. on Friday. The bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share	When ex-Dividend	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
189,049	Stk	July 31	4	4%	Aldershot 4 p.c. Pref.	..	60–65	..
1,551,868	,,	Sept. 26	9½	9½%	Alliance & Dublin Ord.	82–84	43–48	..
874,000	,,	July 11	4	4%	Do. 4 p.c. Deb.	76–79	60–62	..
280,000	5	Oct. 30	7½	8%	Bombay, Ltd.	5⅞–6⅛	2½–5⅝*	..
50,000	10	Aug. 28	16	12%	Bourne- mouth Gas and Water { 10 p.c. B 7 p.c. Pref. 6 p.c. 4 p.c. Deb.	25–30	19–20	..
388,110	10	,,	7	7%		15–15½	10–11	..
115,000	10	,,	6	6%		13¾–14	9½–9⅝	..
159,740	—	June 27	—	4%		..	65–67	..
992,045	Stk.	July 11	14	37/-	Brentford A Consolid.	381–386	55–60	55⅞
784,990	,,	,,	11	31/8	Do. B New	204–209	57–65	..
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109–111	76–78	..
221,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91–98	64–66	..
214,775	,,	Sept. 11	11	7½%	Brighton & Hove Orig.	208–213	123–128	128½
244,900	,,	,,	8	5⅓%	Do. A Ord. Stk.	154–159	84–89	..
933,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	..
580,000	50	Sept. 26	12½	10%	British	44–45	24–26	25–25⅛
120,000	Stk.	June 27	4	4%	Do. 4 p.c. Deb. Stk.	88–90	63–65	..
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85–87	50–53	..
100,000	10	—	—	—	CapeTown & Dis., Ltd	1½–2¼	6⅞–7⅛	..
100,000	10	Oct. 30	—	4½%	Do. 4½ p.c. Pref.	4–6	6½ 6⅞*	..
100,000	Stk.	June 27	4½	4½%	Do. 4½ p.c. Deb. Stk.	70–75	61–66	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108–110	..	..
1,513,280	,,	Aug. 14	5/9/4	30/-	Commercial 4 p.c. Stk.	106–108	55–60	55½
660,000	,,	,,	5½	26/8	Do. 3½ p.c. do.	108–106	50 55	52
475,000	,,	June 11	8	8%	Do. 3 p.c. Deb. Stk	69½–71½	50–52	51½
600,000	,,	,,	4	—	Continental Union Ltd	76–79	35–40	..
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115–118	60–65	..
51,600	Stk.	Aug. 28	14½	13⅔%	Croydon A 10 p.c.	..	150–160	..
278,400	—	,,	11½	9%	Croydon B and C 7 p.c.	..	100–110	..
493,270	Stk.	,,	8	6⅔%	Derby Con. Stk.	128–130	..	..
66,000	,,	—	4	4%	Do. Deb. Stk.	102–104	..	..
1,002,180	10	July 30	10	5/0	Europeans, Ltd.	17½–18	12–18	12½
15,398,975	Stk.	,,	4/17/4	30/-	Do. 4 p.c. Ord.	98–102	58–61	59½–60½
2,600,000	,,	,,	9½	36/8	Gas Light and Coke { 8½ p.c. max. 4 p.c. Con. Pref. 8 p.c. Con. Deb. 10 p.c. Bonds	70–79	46–48	46–46½
4,062,385	,,	,,	4	4%		90–92	55–58	6 ⅜ –67⅛
4,674,850	,,	June 11	8	8%		79½–74½	52–55	52½–53
150,000	,,	,,	10	10%		..	..	..
83,500	,,	Sept. 11	5	4⅓%	Hastings & St. L. 5 p.c.	..	57–62	..
255,740	,,	,,	8½	2⅔%	Do. 5½ p.c	57–59	40–45	..
70,000	10	April 26	11	7⅓%	Hongkong & China, Ltd.	16½–16¾	8–9	..
56,538	Stk.	Aug. 28	9	8⅓%	Hornsey 7 p.c.	..	110–115	..
181,000	,,	Sept. 11	7½	5⅝%	Ilford A and C.	151–154	88–94	..
85,750	,,	,,	6½	4⅓%	Do. B	115–118	67–72	..
65,500	,,	June 27	4	4%	Do. 4 p.c. Deb.	92–94	61–64	..
4,949,000	,,	May 14	9	4½%	Imperial Continental	150–160	133–138	133–136
1,325,000	,,	Aug. 14	8½	8½%	Do. 8½ p.c. Deb. Red.	84–86	80 83	..
235,943	,,	Sept. 11	6½	6½%	Lea Bridge Ord. 5 p.c.	119–121	87–92	..
2,498,905	,,	Feb. 26	10	42/6	Liverpool 5 p.c. Ord.	211–213 146–148	..	..
806,088	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	..	..
155,736	,,	Aug. 14	7/5/8	33⅓%	Maidstone 5 p.c.	..	56–61	..
75,000	5	June 11	8	8%	Malta & Mediterranean	4½–4⅝	1–2	..
250,000	100	Oct. 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99–101	90–97	..
541,920	Stk.	May 29	4	—	Monte Video, Ltd.	11½–12	68–71	67–69⅞
1,575,892	,,	July 30	4½	3½%	Newcastle&Gateh'd Con.	98½–99½	64–65	..
599,726	,,	June 27	8¼	8½%	Do. 8½ p.c. Deb.	85–88	67–68	..
15,000	10	Sept. 11	—	11%	North Middlesex 10 p.c.	..	18½–18⅝	..
55,940	10	,,	7/14/0	7%	,, ,, 7 p.c.	14–15	9–9½	..
900,000	Stk.	May 14	8	8%	Oriental, Ltd.	117–122	108–106	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½–72	4⅜–5½	..
60,000	50	Aug. 28	18	7½%	Porrsea, Island B	128–131	74–76	..
100,000	50	,,	12	6⅔%	Do. C	118–121	56–58	..
249,980	5	April 29	8	—	Primitiva Ord.	5½–6	1⅜–1⅔	30/—35/-
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½–5	3–3½	65/—67/6
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91–98	71–75	..
600,000	Stk.	July 30	4	4%	Do. ,, ,, 1911	..	49–52	..
846,198	,,	June 27	4	4%	River Plate 4 p.c. Deb.	85–87	49–52	51–51½
150,000	10	Sept. 26	6	6/-	San Paulo { 6 p.c. Pref. 5 p.c. Deb.	10½–11	7½–8	..
125,000	50	July 2	5	5%		47–49	40–49	..
195,000	Stk.	Aug. 28	10	5%	Sheffield A	228–224	87–92	..
209,984	,,	,,	10	5%	Do. B	222–224	87–92	..
528,500	,,	,,	10	42⅚%	Do. C	220–222	80–85	..
188,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	Oct. 15	9	10%	South African.	10½–11½	12–13	..
6,609,895	Stk.	Aug. 14	5/4/0	30/-	South Met. 4 p.c. Ord.	111–113	58–61	58–59½
250,000	,,	July 11	—	5%	Do. Pref.	..	94–96	95
1,895,445	,,	,,	8	8%	Do. 3 p.c. Deb.	72½–74½	51–54	53–53½
294,890	,,	Aug. 14	8½	5%	South Shields Con. Stk.	157–159	104–106	..
952,795	,,	,,	6	8⅓%	S'th Suburb'n Ord. 5 p.c.	114–116	68–73	..
187,558	Stk.	June 27	5	5%	Do. 5 p.c. Deb. Stk.	116–118	85–88	..
647,740	,,	May 14	7½	8%	Southampton Ord.	99–102	68–68	..
121,275	,,	June 27	4	4%	Do. 4 p.c. Deb. Stk.	..	63–65	..
120,000	,,	Aug. 14	—	4⅓%	Tottenham District { A 5 p.c. B 3½ p.c. 4 p.c. Deb.	135–138	70–75	74
782,275	,,	,,	6	3⅔%		115–117	50–55	50–54½
181,255	,,	June 26	4	4%		87–89	64–66	..
182,880	10	Dec. 30	5	—	Tuscan, Ltd.	5–6	1–2	32.6
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93–95	45–50	..
286,478	Stk.	Sept. 26	5	3⅓%	Tynemouth 5 p.c. max.	103½–109	74–76	..
80,000	,,	Aug. 28	8⅜	55/-	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151–156	85–90	..
255 696	,,	,,	6¼	40/-	Do. B 3½ p.c.	129–134	63–68	..
108,075	,,	,,	—	38/6	Do. C	..	63–68	..
140,865	,,	,,	—	38/6	New Ordinary	..	63–68	..
352,000	,,	,,	6½	38/9	Wimbledon 5 p.c.	117–122	65–70	..
98,000	,,	,,	6¼	40/-	Epsom 5 p.c.	121–126	65–70	..
88,416	,,	June 27	8	8%	5 p.c. Deb. Stk.	66–69	49–51	..

* Ex Div.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Oct. 29.]

Nos. 25,619—26,258.

BECKET, W. H.—"Geyser, &c." No. 25,791.
BEST, R. D.—"Pendants for lighting." No. 26,132.
BIRCH, G.—"Inverted bunsen burners." No. 25,726.
BRAY AND CO., G.—"Incandescent gas-burners. Nos. 25,925, 25,926.
BRUCE, R.—"Electric and gas fires." No. 25 918.
COKE AND GAS OVENS, LTD.—"Regenerative coke-ovens." No. 26,026.
FOX, T.—"Securing leather diaphragms in meters." No. 25,753.
GERCKE, M.—"Distilling bituminous coal, brown coal, and shale by superheated steam." No. 25,655.
GIBBONS BROS.—"Supporting or suspending articles in furnaces, &c." No. 26,215.
GIBBONS BROS.—"Furnaces for manufacture or treatment of steel, &c." No. 26,224.
GREEN, J. C.—See Gibbons. No. 26,215.
HAWKINS, L.—"Portable gas-fuel fire combination cooking-range." No. 25,639.
JENNENS, J. R.—"Gas-burners, &c." No. 25,995.
KIMBELL, H. F.—See Coke-Ovens. No. 26,026.
LANGFORD, H. H.—"Adaptable plate-rack and splash-plate for gas-cooker." No. 26,229.
MILLSOM, H. W.—"Incandescent gas lighting." No. 25,914.
OPPERSDORFF, H. G.—"Gas-burners." No. 26,201.
PEMBER, A. H. & H.—"Air-regulators for atmospheric gas-burners." No. 26,069.
ROBINSON, S.—See Fox. No. 25,753.
ROSS, D. J.—"Device for economizing and enriching gas." No. 25,683.
SCHEFFER, W.—See Oppersdorff. No. 26,201.
THOMPSON, W.—"Gas-stoves." No. 25,702.
TROLLEY, J.—See Becket. No. 25,791.

Proposed New Gas-Works for Dumbarton.—The Dumbarton Town Council have sold the gas-works site and buildings to a firm of shipbuilders for £60,000. The Town Council are to proceed with a Provisional Order to confirm the sale, and to secure powers to obtain land for the erection of new gas-works.

Enniscorthy Gas Trouble.—The Enniscorthy Employers' Federation have locked-out all labourers who are members of the Irish Transport Union and the Agricultural and General Workers' Union. The latter bodies retaliated by calling out the gas workers—a step which, of course, led to serious inconvenience in the town.

The Chapel-en-le-Frith Rural District Council have decided to oppose an application of the Gas Company to increase the price of gas from 4s. to 6s. 3d. per 1000 c.ft.

The Directors of the Montevideo Gas and Dry Dock Company, Ltd., have declared an interim dividend on the ordinary stock for the half year ended June 30, of 2½ p.ct. (actual), free of income-tax, payable on Dec. 1.

For the year 1918-19, the Stockton-on-Tees Corporation required £2270 to meet the cost of official salaries in connection with the gas department. For the last completed year before the war (1913-14), £1644 was needed.

While a workman was seeking at Wirksworth an escape in a gas-main, a light which he was using for the purpose ignited the gas. The man got off with a severe shaking; but the cover of a sewer manhole was displaced by the explosion.

The Rochdale Gas-Works Sub-Committee have agreed to receive Mr. J. Williams, of the National Union of General Workers, to discuss the question of the wages of meter inspectors and lamplighters, whose application for a further advance has been declined.

A verdict of "Suicide by gas poisoning" was returned at an inquest by the Dublin City Coroner respecting the death of Chas. W. Fuller, an ex-soldier, who was found in the kitchen of his house with a tube in his mouth attached to a tap of the gas-stove.

To the September issue of the "Industrial League Journal," Sir Robert Hadfield, Bart., contributes an article on the "Industrial League and Progress." The number also contains a full report of the three days' conference of employers and employed held in Birmingham during August.

On Monday evening of last week the Lord Mayor of Manchester (Alderman William Kay), who is Chairman of the Gas Committee, presented military honours, including the Meritorious Service Medal, the Military Medal, and the Military Medal and Bar, to eleven of the members of the staff of the Manchester Corporation Gas Department.

At the Bradford City Council meeting on the 28th ult., complaints were received from the railway locomotive enginemen and firemen with reference to the bad lighting of the streets at the main points during the night time. One of the labour councillors stated that, unless some immediate steps were taken to remedy the grievance, the railwaymen "would stay at home until there were more street-lamps lighted."

The Directors of Meters Ltd., being of opinion that the profits of the Company during the past half year warrant the payment of interim dividends to Sept. 30, at their meeting last week declared the following on account of the dividends for the current year: On the preference shares at the rate of 5½ p.ct. per annum, and on the ordinary shares at the rate of 5 p.ct. per annum. The dividend warrants will be posted on the 14th inst.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

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"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for Gas-Works.
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Phone: 4032 Avenue. Tele: "Berk, Phone London."

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REPAIRS RECEIVE PROMPT ATTENTION.
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BAGLEY, MILLS, & CO., Ltd.,
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SPECIALLY prepared for the manufacture of SULPHATE OF AMMONIA.
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Telegrams: "Briparimat, Wood, London."
'Phone: Palmer's Green 608.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every Description of GAS APPARATUS, ELEVATING, CONVEYING, and TELPHERAGE PLANTS, also STOKING MACHINERY, ROSE MOUNT IRONWORKS, ELLAND.

MEWBURN, ELLIS, & CO.,
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Telegrams: "Patent, London." 'Phone: 248 Holborn.
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A BRITISH Oxide Cheaper and Better than Bog Ore. 85 per cent. Water, 75 per cent. Ferric Hydrate.
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See Illustrated Advertisement, Aug. 26, p. 475.

SULPHATE OF AMMONIA SATURATORS and all LEAD and TIMBER WORK in connection with Sulphate Plants.
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CARBURETTED HYDROGEN PLANT
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COMPLETE GASIFICATION OF COAL.
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(See p 286.)

APPOINTMENTS, &c., WANTED.

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ASSISTANT Engineer on London Works DESIRES CHANGE. Fourteen Years' Practical and Technical Experience, Works' Operations and Management. Good education. Bronze and Silver Medallist, Gas Engineering; Honours, Mechanical, Structural Engineering, Chemistry, and Gas Supply.
Address No. 6785, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

DEPUTY Engineer and Manager of large (700 Million) Gas-Works seeks Appointment as ENGINEER and MANAGER to 50 to 200 Million Gas Company in South of England. Practical Experience in Erection and Control of all Systems of Retorts, and in all Modern Methods of Manufacture and Distribution, Residuals, Constructional Work, and General Management of all Departments. Good Draughtsman and Chemist. City and Guilds Honours in Gas Engineering and Distribution. Excellent testimonials. Age 38. Salary according to size of Works, District, &c.
Address No. 6784, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

APPOINTMENTS, &c., VACANT.

No. 6779.

MR. J. PARK, of Kildwick, has been appointed to the Position advertised under No. 6779; and the Directors of the Company wish to convey their grateful THANKS to the remaining Candidates whose applications have been unsuccessful.

APPLICANTS for the Position of ENGINEER FOR LONDON GAS COMPANY are THANKED, and informed that the APPOINTMENT HAS NOW BEEN MADE.

WISBECH LIGHTING COMPANY AND WISBECH WATER-WORKS COMPANY.

WANTED, at once, an Engineer and MANAGER for the joint Companies. Applicants must have a thorough knowledge of Gas Manufacture by Modern Methods, with Energetic Management. Able to Engineer the Water Supply by means of existing High-Pressure Steam Power, to arrange Extension Pipes and Mains as required and Estimate Cost of same.
An Eight-Roomed Dwelling House on the Gas-Works with large Garden, rent free, with necessary Coal, Gas, and Water included.
Applications invited, stating Age, Salary required, Experience, present Occupation, and when at liberty to commence Duty, with Testimonials, to reach me at the C mpanies' Office before Nov 20.
Personal Canvass of Directors or Officials not permitted; but any further Information required will be given, or an Inspection arranged if desired, on Application to
THOS. B. COALES,
Clerk to both Companies.
1, York Row, Wisbech,
Oct. 27, 1919.

STOCKPORT CORPORATION.
(GAS-WORKS.)
SECRETARY AND ACCOUNTANT.
APPLICATIONS are invited for the Appointment of SECRETARY and ACCOUNTANT of the Gas Department.
Salary, £400 per Annum. No War Bonus will be paid.
Candidates must be Experienced in Gas-Works Accounts, Business Affairs, and Organization.
Applications, stating fully the Qualifications and Experience of the Candidate, endorsed "Secretary and Accountant," must be addressed to the Chairman of the Gas Committee, and Delivered at my Office not later than noon on Thursday, the 18th day of November next.
ROBERT HYDE,
Town Clerk.
Town Hall, Stockport,
Oct. 30, 1919.

ENGINEER wanted who thoroughly understands High-Pressure Plants and Adjustments of Burning-Off Machines for Gas-Mantle Works.
Apply, by letter, with full Particulars, Wages required, &c., to No. 6783, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

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EXPERIENCED Draughtsman required to TAKE CHARGE of the Distribution Drawing Office, having a general knowledge of Gas Engineering and Capable of Making Accurate Surveys. Good Prospect for a Capable Man. Salary per Annum, £230, plus a War Bonus of £92 10s.
Apply, giving full Particulars of Experience, Age, and *copies* of recent Testimonials, to the DISTRIBUTING ENGINEER, Gas Department, Council House, BIRMINGHAM.

DRAUGHTSMEN (Two) Wanted.— Must be First-Class Men Experienced in Constructional Steel Work and Elevating and Conveying Machinery.
Apply, with full Particulars of Experience, to DRAKES LIMITED, Constructional Gas Engineers, HALIFAX.

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Apply, by letter, stating Age, Salary, and Experience, to No. 6787, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

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WANTED—Positive Rotary Blower, Belt Driven, to Deliver not less than 7000 c.ft. of Air per Minute against 8 oz. Pressure. Improved Roots or Gas Exhauster Type preferred, New or Second Hand.
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Further Particulars may also be obtained from the ADMIRALTY MARSHAL, ROYAL COURTS OF JUSTICE, W.C. 2.
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FOR SALE—One Bryan Donkin Gas ENGINE AND EXHAUSTER, complete with 12-in. Disc Valves and Engine Governor. Capacity, 50,000 c.ft. per hour. This plant is in First-Class Working Condition; being too small for our present requirements.
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Offers for this Apparatus on Rail at these Works, to be addressed to the undersigned, endorsed "Gas-Engine and Exhauster," and to be received not later than noon on Friday, Nov. 14.
B. W. SMITH,
Engineer and Manager.
Gas-Works, Pleck, Walsall,
Oct. 31, 1919.

TO Gas and Electricity Works.—You cannot Complete your Works without using CHARKHAM'S Chemically Cleaned, Washed, Sterilized, and Calendered MACHINERY WIPING MATERIAL—no Wrinkles. Packed in ½ cwt. pressed bales at 68s. per cwt.; ¼ cwt. Sample sent Carriage Paid to any Districts on receipt of your Cheque for 30s. Provincial Inquiries invited. The Wipers are famous for cleanliness. Send us your orders and we will do the rest.
J. CHARKHAM, Arthur Street, ALDERSHOT.
Telephone: Aldershot 60.

CONTRACTS OPEN.

THE Shrewsbury Gas Light Company are prepared to receive TENDERS for their Supply of GAS OIL during the next Six Months, Delivered by Canal Tank Boat at the Gas-Works, Shrewsbury.
Tenders should specify Origin, Specific Gravity, and Flash Point of the Oil offered, and be addressed to the undersigned,
C. M. D. BELTON,
Engineer, &c.